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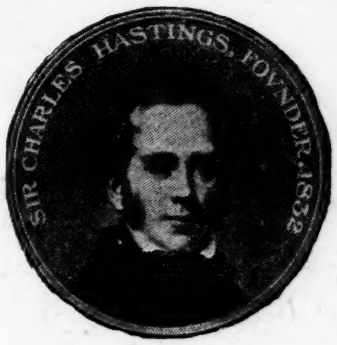

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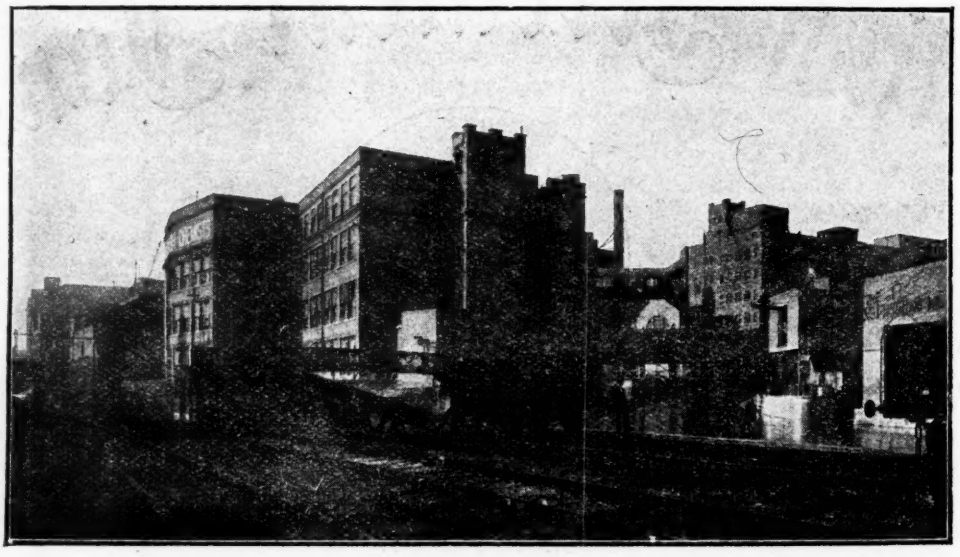

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DISCUSSION ON BLOOD DISEASES IN CHILDREN.

OPENING PAPER

BY

J. HUGH THURSFIELD, M.A., M.D.Oxon., F.R.C.P.,
Assistant Physician, St. Bartholomew's Hospital; Physician, Hospital for Children, Great Ormond Street.

In the last quarter of a century many workers in many lands have busied themselves with the task of trying to penetrate the mystery of the failure of the haemopoietic system in man. It has not been possible for any of us, especially during the years of war, to keep pace with the amount of written matter on this subject, and often it has seemed that medical science in this department is at a standstill.

It is certain that no striking advance has been made in our knowledge of the subject since the discovery of the disease leukaemia in 1841, eighty years ago, initiated a period in which the diseases of the anaemia type have been carefully studied. But though there has been no single new fact of equal importance added to our knowledge in the last twenty-five years I believe that our discussion to-day will show that there has been a real advance in our general conception of the whole subject, and that we can now classify and arrange our knowledge with a precision and an accuracy which would have been impossible at that time, and which will serve the important end of indicating not only the gaps in our science but also the nature of the means by which these may be filled.

Before we enter upon the discussion of the anaemias of children it will be well to attempt to define exactly the scope of our subject. It is not easy to define what we mean by anaemia, though it is easy to recognize its existence. I suppose that I may take it for granted that we are in agreement that during life the corpuscular elements of the blood, both red and white, are derived from the bone marrow, although it is possible that some at least of the lymphocytes are produced from lymphoid tissue elsewhere; and that the haemoglobin, whatever may be the exact site of its formation, enters into the corpuscle within the bone marrow. Anaemia is therefore in the broadest sense an affection of the haemopoietic tissue of the bone marrow, or in some cases possibly merely a defect of haemoglobin formation.

I think that we shall also be in agreement that this function of the bone marrow may be disturbed by toxins, which may act either (1) by diminishing its reproductive powers, or (2) by destroying the product more quickly than it can be formed. As an example of the first we could instance any of the common diseases which produce a temporary anaemia; the influence of some of the specific fevers, or of conditions of malnutrition, which produce an anaemia apparently more dependent on a general lowering of health than upon any special toxin. The anaemia resulting from a large or persistent haemorrhage in which the finished product is removed more quickly than it can be reproduced is an example of the second. It is, however, probably true that in most cases of anaemia both forces are at work; there is a poisoning of the haemopoietic system and an exaggerated destruction of the finished product. Of the nature of the poisons we know next to nothing, though the study of bacterial haemolysins and of certain chemical substances has thrown some light upon the problems, and it is further known that certain x rays have a profound influence on blood formation. But whatever the nature of the poisons the ultimate source of many of them is almost certainly infective, and our power to arrange and classify the various types of these diseases seems to me to be dependent on the recognition of this fact. But it is possible that there are other causes, congenital or acquired, and I should hope that there will be some discussion on congenital or inherited abnormalities of blood formation.

The next point which I would suggest for discussion is the methods which we have employed and are now employing for the elucidation of the problems of anaemia. It is true that experimentally by the use of powerful tissue poisons and by dieting we have been able to produce in animals anaemia which is in many respects the counterpart of some of the anaemias which we meet with in the human being. But for the most part we have relied on clinical observation and the study of the morphology of the blood corpuscle, especially as seen in dried and stained films. I do not wish it to be supposed that I belittle this method. It has supplied us with a means of differentiating some of the forms of disease under discussion, and has in many ways helped the clinical physician, and further, has modified some of our radical conceptions of disease; but I am inclined to think—and this is a point which our discussion can usefully debate—that the knowledge which we can derive from this method of study is now stabilized, and that much of the later work in this particular field is sterile. The controversy which rages, for instance, about the exact nature and origin of the lymphocyte of the bone marrow, the pre-myelocyte, the pro-myelocyte, myeloblast, or primitive cell, does not appear to me to promise any addition to our essential knowledge of the anaemias. There are, on the other hand, many problems in connexion with the function and life-history of both the red and white corpuscles of the blood, but especially of the white, the solution of which would probably be of great value. We know something of the functions of the polymorphonuclear leucocyte; we know nothing of the basophil, and next to nothing of the eosinophil. What is their normal function, and why in certain circumstances, but specially in leukaemia, is their number in the circulating blood so enormously increased?

General Survey.

From these definitions and speculations I pass on to a general survey of the clinical position as it stands at the moment, and for our present purposes propose to classify the anaemias as (1) congenital; (2) secondary, that is, those in which a removable cause is operating to produce the anaemia; and (3) primary, those in which an unknown, and at present usually unascertainable, cause is operating.

Congenital Anaemia.

That there are children who within a few days of birth exhibit a remarkable degree of anaemia is beyond doubt, but this for the most part quickly disappears, and it is exceptional to meet with a newborn baby suffering from an anaemia which calls for treatment. The most common cause of anaemia at this age is the occurrence of severe sepsis, or more rarely lues or tuberculosis. The children who are born of leukaemic mothers are, I believe, without exception unaffected; though there are on record a few cases of leukaemia occurring within a few days of birth, who, again without exception, have been born of healthy mothers.

But there is a disease known as congenital acholuric jaundice, of which anaemia may be a very prominent symptom. The term "congenital" is in a sense misleading, for I believe that I am correct in stating that no case of this disease has been hitherto recognized in the first two years of life, though the most striking peculiarity of the affection, the fragility of the red blood corpuscle without the anaemia or the jaundice, has been found in some of the youngest members of an affected family. What is the exact relation of this peculiarity to the developed disease is unknown, for many individuals who possess it pass through life without disability, while in some others an anaemia develops which threatens their existence, or at least makes it a life of invalidism. There is one family with which I am acquainted

in which the affection has been recognized in four generations.

Apart from this disease the instances of congenital anaemia are few, though perhaps I should briefly refer to those fatal cases of jaundice with anaemia recurring in child after child of the same mother, of which several examples have been recorded by Busfield, Arkwright, Auden, and others. They appear to be cases of a severe form of toxaemic jaundice.

Secondary Anaemia.

In regard to those anaemias of which we can definitely recognize a cause, either the presence of some acute infection, or of some chronic disease such as tuberculosis or syphilis, or due to the influence of defective nutrition, I have little to say. It is probably agreed that the defect of the blood formation is here due to the general malnutrition of the tissues or to the action of a poison actively destroying the elements of the blood as rapidly as they are formed. The study of such cases is not however without its lesson, for it throws light on the reaction of the haemopoietic tissues to various stimulants. It is notorious, for example, that sepsis gives rise as a rule to a marked polymorphonuclear leucocytosis, yet from time to time cases are reported in which in place of the expected polymorphonuclear leucocytosis there is instead a rise in the lymphocytes. No explanation of this phenomenon is offered as yet.

Before I pass to the consideration of what I have called the primary anaemias I must mention von Jaksch's pseudo-leukaemic anaemia of infants. By my own definition this is a primary anaemia, yet it is so obviously the product of external conditions and environment that I think we may fairly consider it in this place. It is an anaemia of the second and third years of life, rarely seen before the end of the first year and almost invariably ceasing by the end of the third year. Moreover, it is, I believe, almost confined to the hospital class of the population, and does not occur among children who are brought up under favourable conditions. It is a characteristic disease, with its waxy pallor, the enormous spleen and the striking presence of a high proportion of typical myelocytes in the circulating blood. It is not a fatal disease in itself, that is, the patients do not die of the anaemia; they die of intercurrent infections, bronchopneumonia and diarrhoea. I personally am convinced that it is a disease different from any other form of anaemia, but others have maintained that any severe anaemia in an infant may assume this type. The objection to this contention seems to me to be that no one has ever seen the development of this complaint from an ordinary secondary anaemia. Usually there is no difficulty in recognizing the disease, but there may arise difficulties in the more severe cases in the distinction from leukaemia. I have seen two such cases, both of which eventually made a good recovery. The disease is of extreme interest because of its resemblance to leukaemia; if it is related to leukaemia it is difficult to perceive why there should be so great a difference in the prognosis of the two diseases, and the tissues *post mortem* do not bear the least resemblance to leukaemic tissues either in the liver, spleen, or bone marrow.

Primary Anaemia.

I turn now to the consideration of the most difficult of the problems of our subject: the diseases which await accurate classification as a preliminary to a better recognition of their causes, and therefore of more efficient treatment. I know that opinion in this sphere is diverse, and that the discussion will most probably be chiefly concerned with this problem, and therefore I propose to challenge dispute by making my own statements more dogmatic than either my knowledge or my judgement properly permit. In this sense, therefore, I suggest that there are only three types of severe blood disease which occur in children before the age of puberty, and that these are leukaemia, purpura, and a grave anaemia to which a number of names have been attached but which is most familiar, perhaps, by the title of "aplastic anaemia." Personally I prefer to call the disease "the grave anaemia of children," because the term "aplastic" seems to me to be strictly applicable to any severe grave anaemia, even to some of the secondary anaemias in which recovery is the rule, whereas in this disease recovery is very uncommon. It would be, to my thinking, just as proper to call leukaemia "hyperplastic anaemia," a proposition which, I think, most of us would condemn at once. Nomenclature is always a difficulty in medical problems; the essential thing is to be quite clear about the meaning of the terms which we use.

By leukaemia, therefore, I mean an anaemia characterized by enormous increase in one or more of the leucocytic elements of the circulating blood; purpura is a name given to an anaemic disease in which the chief characteristic is the occurrence of extravasations of blood in and beneath the skin and mucous membranes; and the anaemia gravis of children is a disease characterized by a progressive diminution of the corpuscular elements, both red and white, of the blood, and by progressive failure of haemoglobin formation. There are, of course, other features which many of us would include in our definition, but I am here concerned to reduce the description to its simplest terms. When we meet with characteristic examples of any of these types there is no difficulty; perplexity begins when, as not seldom happens, the case does not conform to type. Most often this happens in the most acute cases, and then the differential diagnosis between leukaemia of an abnormal type, an anaemia gravis, a fulminant purpura, or possibly an unusual form of lymphadenoma, demands careful consideration. In adults and occasionally in adolescents there is also the diagnosis of infective endocarditis to be considered, but in younger children this problem is seldom present.

Let us take first the problems of leukaemia. There are, it is agreed, two main types of this disease: first, the chronic myeloid leukaemia, characterized by the presence of a large spleen and a great abundance of myelocytes in the peripheral blood. The type is not that most usual in children. It is more usual to meet with the other variety, acute lymphocytic leukaemia, in which there is often great swelling of the superficial lymphatic glands, extreme anaemia, swelling of the spleen, moderate in comparison with that in the myeloid type, and a tendency to bleed from the skin and mucous membranes. This is commonly called lymphocytic leukaemia, but the cells found are not the ordinary lymphocytes of the normal blood, but cells larger and with larger nuclei; in fact, though usually devoid of granules they are nearer in general structure to the myelocyte of the bone marrow. About the origin and nature of these cells controversy rages, but I believe that whatever their characters there will be a general agreement to the proposition that they belong to, and are derived from, the bone marrow. If this is agreed we arrive at the position that whatever the type of cell met with in the particular case leukaemia is always a disease of the bone marrow. I should myself be prepared to go further and claim that the character of the leucocytes depends chiefly, though certainly not entirely, on the acuteness of the affection; the more acute the onset and progress of the case the greater the tendency to the production of the non-granular "lymphocytic" cells, and in the more chronic cases there is a high probability of the cells being of the fully-formed myelocytic and polymorphonuclear type. I should here indicate that this conception will do away with the "mixed" leukaemias.

The next problem which faces us is that from time to time we meet with cases having the general characteristics of a leukaemia which show no excess of leucocytes, rather tend towards a leucopenia. For such cases the term "aleukaemic leukaemia" has been used, together with other names, of which perhaps "leukanaemia" is the most popular. The name "aleukaemic leukaemia" should at any rate be reserved for those cases in which the leucocytes, though diminished in number, are mainly of the "lymphocytic" or "myeloblastic" type, and these should be sharply differentiated from those cases in which with the same paucity of leucocytes the normal polymorphonuclear and lymphocytic cells are the majority of those present. These belong, in my opinion, not to the leukaemic group, but to the class of purpura or even more to that of anaemia gravis.

Have we any other criteria than the character of the leucocyte present in a particular case? After death the

bone marrow even of these "aleukaemic" cases is darker red than normal, and both to the naked eye and to the microscope presents a striking difference from that of the anaemia gravis type.

To make this plain, I must quote the case of a boy aged 1¾ years, who, after an illness of one month, came to the hospital with a purpuric rash all over the body, and a fever of 100.6°. He had general slight enlargement of the superficial glands, but the liver and spleen were not especially prominent. His blood count showed:

Red blood corpuscles... ...	2,180,000 per c.mm.
White blood corpuscles ...	3,800 per c.mm.
Haemoglobin...	30 per cent.

So far he might have been classed as a grave anaemia, but the differential staining of the leucocytes showed that of the total of 3,800 no less than 3,100 were "lymphocytes" of the bone-marrow type, while over 400 of the remaining cells were counted as myelocytes; that is, the blood showed the leukaemic characteristics. After death his bone marrow was markedly redder than normal, looking like red currant jelly, and microscopically the marrow and tissues were crammed with the "lymphocytic" type of cell.

A further means of differentiation after death is afforded by the fact that in the leukaemic disease the "free iron reaction" is seldom present, whereas in the anaemia gravis type this is commonly demonstrable at least in the liver, and in the markedly yellow bone marrow. The mere fact, therefore, that a particular case of severe anaemia has a low leucocyte count and an "aplastic" condition of the circulating blood does not suffice to remove it from the category of leukaemia. The bulk of the cases reported as leukanaemia, and many reported as "aplastic anaemia," seem to me to belong to this type.

There are, of course, further difficulties in connexion with leukaemia, notably their relation to the group which I will call broadly "chloroma," cases in which the blood has the characters of a "lymphocytic," or more rarely of a "myeloid" leukaemia, though the deposits in the organs show all the characters of malignant growth. The consideration of these cases has led some authorities to conceive leukaemia as a whole to be of the nature of a new growth; a conception which, for the bulk of the examples, seems to me to be quite untenable.

I pass on to the consideration of the anaemia gravis, which in childhood takes the place, according to my own experience, of the pernicious anaemia of adults. The main features of the affection are well illustrated by the case of a girl of 11½ years of age who had a six months' history of progressive weakness with increasing pallor. On admission to the hospital she had:

Red blood corpuscles... ...	1,140,000 per c.mm.
White blood corpuscles ...	5,200 per c.mm.
Haemoglobin...	30 per cent.
Colour index	1.3

Of the leucocytes 1,800 were polymorphonuclear cells, and in successive counts these never fell below that total, and often rose above 2,000, and as the disease progressed they became more and more the predominant white cell, in the later counts representing two thirds of all the leucocytes present. She had very few nucleated red cells and no abnormal leucocytes. She had petechiae sparingly distributed on the limbs and trunk, retinal haemorrhages, epistaxis, and blood in the stools and vomit. She died within the month, and at the autopsy her bone marrow was found devoid of any trace of red colour; her liver gave a strong "free iron" reaction, and there was no infiltration of any of the organs with leucocytes.

Such a case is the type commonly called "aplastic anaemia," but, as I have already said, I prefer to give it the less debatable name of "anaemia gravis," because among other reasons I can discern no mark which would separate it from cases of severe secondary anaemia which recover. It is not a specific entity, any more than is the pernicious anaemia of adults. Just as in that disease our clinical difficulty is to discover the source of the infection which gives rise to toxaemia, which in turn attacks the haemopoietic tissues, so in these cases I believe that if we can only discover the focus of infection we may succeed in saving them. In the body of my patient after death one kidney was found riddled with small abscesses. It is, of course, possible that these were the result of infection late in the disease; but it is also possible that they were the cause of the profound toxaemia and anaemia. During life there was no indication of infection of the urinary tract, save that on one occasion, about ten days before death, an abundance of leucocytes were found in the urinary deposit under the microscope.

The remaining types of severe anaemia can be briefly dealt with. From time to time there occur fatal profound anaemias, which belong to the purpura group; almost certainly they are also infective in origin. These can usually be separated from both of the previously mentioned types by the absence of glandular, splenic, or hepatic enlargement, and by the tendency of the blood to assume the post-haemorrhagic characters, that is, a moderate polymorphonuclear leucocytosis and a red blood count higher than 2,500,000 per cubic millimetre, with an abundance of nucleated red corpuscles.

I mentioned earlier infective endocarditis as a possible cause of severe anaemia. It is, of course, familiar to everyone that this disease may, in the adult, give rise to an anaemia which presents the characteristics of an "aplastic anaemia." In children the difficulty must be very rare, and I, at least, have never met with a case in which the condition of the blood gave rise to doubt. I have seen one case of lymphadenoma which was diagnosed as "aplastic anaemia"—wrongly, in my opinion, for there was in every count an unusual number of nucleated red corpuscles, amounting in one instance to over three thousand per cubic millimetre. In addition, she had from time to time an active polymorphonuclear leucocytosis. She died after several months' illness, with the typical lesions of Hodgkin's disease.

After this review, what are our prospects of dealing with these anaemias? I have tried to indicate that in my judgement the anaemia gravis type is caused by an infection, and I think that our main efforts should be directed not so much to a study of the characters of the individual type of cell as to the early detection of the focus of infection. It will often elude us, as in the past, but the more we concentrate on this aspect of the problem the greater our hope of success. The same I should hold to be true of the leukaemias, though I do not think that the evidence of infection is here so strong. The anaemia gravis of children is almost confined to the hospital class of patient, and the bulk of them come from the lower grades of the town populations. That is not the case with leukaemia, which apparently makes no distinction and may attack the child brought up in the most perfect surroundings. Yet the disease as a whole seems to be more closely allied to the infections than to the new growths or to any metabolic disease.

I have purposely omitted any reference to Banti's disease, for I have myself never met with an affection in a child below the age of puberty which appeared to me to present the characteristics so familiar to us in later life. But I must not omit to remind you of the curious disease known as Gaucher's type of splenic anaemia. It is, as you know, characterized by a family incidence, an enormous enlargement of the spleen and liver, due to the presence of abnormal cells of the endothelial type, and generally a freedom from physical illness, though the bulk of the organs may cause some disability in later life. Cases of this disease have been reported in infancy, and lately my colleague Dr. Hutchison has had in his charge an infant who died with anaemia and a large liver and spleen, in whose organs these characteristic cells were found after death.

In the leukaemias, then, at present prognosis must be pessimistic and treatment empirical. I have never seen an undoubted case of leukaemia recover permanently, though some have recovered a certain degree of health and lived to a period beyond our expectations. In the other types of severe anaemia if we fail to detect the focus of infection as a rule the disease progresses to death. In the definitely purpuric cases injections of normal horse serum or of human serum sometimes appear to stay the tendency to bleed; but in anaemia gravis neither serums, drugs, nor in my own experience blood transfusions, avail to impede the march of the disorder.

DISCUSSION.

Dr. H. Brooker Mills (Philadelphia) said: I entirely agree that it is hard to define anaemia, and that little advance has been made in its study in recent years. I would like to ask if Dr. Thursfield would consider haemophilia as a "congenital or inherited abnormality of blood formation." I agree with him that lues and tuberculosis, especially the latter, in my judgement, are rarely causes of anaemia in infancy. His classification appeals to me strongly as it simplifies the study of the subject so much, but I am not sure that it would not be improved by reversing Nos. 2 and 3. That sepsis is undoubtedly the main cause of congenital anaemia there can be no doubt, and that "the early detection of the focus of infection" is the direction in which our main efforts should be made is undoubtedly true. In reference to Gaucher's disease, I feel there are probably more cases than have been recognized or recorded.

As to treatment, massage was long since advised by the late Dr. S. Weir Mitchell, who showed excellent results in improving the quality of the blood by this method, especially when combined with rest, but I believe most of his patients were adults. A recent author recommended the use of sodium cacodylate hypodermically, and I have seen good results from its use.

Dr. Herbert Morley Fletcher (London) expressed the thanks of the Section to Dr. Thursfield for his clear exposition of a most difficult subject. He agreed as to the necessity of simplification in the classification of the various forms of the so-called blood diseases. He referred to the comparative frequency of the occurrence of Mikulicz's syndrome (enlargement of the lacrymal and salivary glands) in lymphatic leukaemia in children, especially in the early stages of the disease.

As regards the results of treatment of the grave forms of anaemia in children, he was not so pessimistic as Dr. Thursfield, because although drugs and transfusions might not avert a fatal termination, they might bring about a temporary amelioration.

Dr. John Thomson (Edinburgh), after expressing his high appreciation of Dr. Thursfield's paper, referred to two cases of congenital hypertrophy of the pylorus in strong healthy infants who suffered from severe haemorrhage shortly after Rammstedt's operation. In both cases there was profuse general oozing from the cut surfaces during the operation. In the first case the child died within a few days, and the peritoneum was found to be full of blood. In the second there was very severe haemorrhage from the abdominal wound, which continued until three injections of the father's blood had been given into the subcutaneous tissue. Thereafter the bleeding stopped entirely and the child made a good recovery. What, Dr. Thomson asked, is the relation of such cases to the so-called "haemorrhagic disease of newborn children"?

Reply.

Dr. Hugh Thursfield, in reply, thanked his various critics for the extremely flattering tone of their remarks, and endeavoured to answer some of the points raised. Haemophilia and melaena neonatorum seemed to him to be examples of tissue diseases in which the haemopoietic function was secondarily disturbed. Anaemia gravis, he reiterated, was not a specific entity; it was, in fact, strictly comparable to the pernicious anaemia of adults, which, it was now generally agreed, is not a specific entity.

Mikulicz's syndrome was a phenomenon not at all unusual in "lymphocytic" leukaemia, and was often associated with leukaemic deposits in the skin; but it was a phenomenon which occurred quite independently, and in such cases after long duration it eventually disappeared without producing any alteration in haemopoiesis.

He welcomed particularly the information, given by one speaker in the discussion, that research by new methods into the calcium of the blood was going on actively at Cambridge. New methods were pre-eminently necessary for progress in this sphere, and he hoped to hear more of this in the next winter.

DISCUSSION ON THE GENERAL PRINCIPLES OF TREATMENT IN TUBERCULOUS DISEASE OF THE BONES AND JOINTS IN CHILDREN.

OPENING PAPER

BY

Sir HENRY GAUVAIN, M.A., M.D., M.Ch.Cantab.

I would first tender my thanks to you for having invited me to open the discussion on a subject in which I am deeply interested, and which is now attracting considerable attention, both medical and lay. I deeply appreciate the honour, and shall endeavour in the time allotted me to sketch the more important principles of treatment which modern research and experience indicate as the most suitable for these conditions, and likely to be productive of the best results.

It is, I think, now unnecessary to urge the claims of conservative treatment. The more advanced surgical opinion recognized its value early this century. Reiteration of the fact that a tuberculous bone or joint lesion is an osteitis or arthritis occurring in a tuberculous patient, and not merely a bone or joint affection, is so well appreciated that it hardly needs emphasis. Continued research ever more clearly demonstrates its truth. A tuberculous lesion is but a local manifestation of a more general infection. Probably few if any bone or joint lesions, clinically demonstrable, are independent of other lesions, which may be only discoverable *post mortem*, and general constitutional symptoms of infection are rarely difficult to demonstrate. Tuberculous antigens may be found in the blood and urine of tuberculous patients even before there is clinical evidence of tuberculous disease. Wildbolz[1] and Imhof have facilitated the early diagnosis of tuberculosis by work on the antigens in the urine and blood, and the practical tests they have devised may prove of great value, not only in affording a readier means of early diagnosis, but also as disclosing evidence of activity of disease, a matter of paramount importance, especially in bone or joint tubercle, and one which has not received the attention it demands.

Not only may tuberculous antigens be demonstrated in the blood of tuberculous patients, but the tubercle bacilli themselves have frequently been discovered. Indeed, Sabathe and Buguet[2] have recently devised a technique by which they claim that tubercle bacilli can very readily be detected in the blood. By the method they have introduced they state that in more than 300 blood examinations made from patients with tuberculosis, they have not once failed to demonstrate tubercle bacilli in the blood. Whether this claim will stand the test of further investigation I am unable to say, but it had long previously been known that tubercle bacilli could be demonstrated in the blood of many tuberculous patients, and it emphasizes the fact that we should no longer restrict our vision to the tuberculous bone or joint we are asked to treat, but should take the wider view and treat the patient suffering from tuberculosis. If this extended conception of a tuberculous bone or joint lesion is correct—and the whole trend of evidence constantly accumulating confirms this view—it must most profoundly influence our ideas of treatment, increasing our responsibilities but enlarging our possibilities.

In March of this year I was honoured by the Medical Society of London[3] by an invitation to open a discussion on the non-operative treatment of surgical tuberculosis. In that address I gave with some fullness my views on the desirability of adopting conservative methods in the treatment of tuberculous disease of the bones and joints. To save repetition, I would ask you if you would be good enough to regard this contribution as supplemental to that address. I defined conservative treatment of tuberculous disease of the bones and joints as the adoption of all measures which tend to improve the patient's general health, increase his powers of resistance to tuberculous disease, and preserve or restore the part or parts attacked, in contradistinction to radical treatment, which aims at the cure of the disease by the removal of the local lesion. Such a definition implies the adoption of very active, numerous, and sometimes complicated methods of

treatment, and by no means necessarily excludes surgical interference, although surgery from being the one treatment becomes relegated to an inferior, though still useful, position as a possible aid to cure or amelioration under certain conditions.

Conservative treatment is a treatment involving immense attention to detail. Every possible aid to the patient's cure is invoked, and one's ingenuity is constantly being exercised in exploring any possible avenue which can suggest itself as likely to assist in securing the desired end. Obviously, the ideal treatment would be one which would at once slay and render innocuous the tubercle bacilli infesting the host, yet without at the same time injuring the patient. Such a treatment is at present unobtainable, though it is within the realms of possibility. But, while we still cannot directly and speedily destroy the bacillus in its host, we can do much to render the tissues of the host unsuitable for and resistant to the invading organism, and it is on such lines that the more immediate hope of practical advance may be based.

A general disease demands general treatment. To reinforce and strengthen the natural defences against the attack of the tubercle bacillus is the most practical, and is also a practicable, method of defeating that attack. Life in the open air, in a dust and germ free atmosphere, under the bactericidal and tonic action of the sun, is a first principle in antituberculous therapeutics.

Treatment, then, of tuberculous bone and joint disease may be best conducted on the following lines: General, which would include climatic, hygienic, disciplinary, dietetic, drug, educational or occupational, and such measures. Local, which is largely concerned with the correction or prevention of deformity, and is chiefly orthopaedic in character, subject to those limitations enjoined by the fact that the patient is tuberculous. With local treatment may be included those surgical measures which are still required, but the indications for which are continually diminishing as skill in the employment of conservative treatment increases. Lastly is what I may call adjuvant treatment. The relative importance and scope of application of adjuvant measures of treatment have largely increased in recent years, and represent perhaps the most interesting advances made in the conservative treatment of bone and joint tuberculosis. Amongst such aids are heliotherapy, balneotherapy, chemiotherapy, vaccine treatment, and the therapeutic employment of x rays and other electrical agents. In addition, auxiliary methods of treatment, including attention to conditions which have a direct or indirect bearing on the disease being treated, should not be neglected, such as the care of the patient's teeth, tonsils, eyes, ears, skin, etc.—matters so often overlooked, but of such associated importance.

To discuss these various forms of treatment summed up in the word conservative, the indications for their individual or combined employment, the stage at which any one should be applied, the extent to which they may be usefully adopted, the effects which they may separately or in combination be expected to produce, and the ultimate results which may be reasonably anticipated, is obviously impossible. Certain of them are only fully applicable in a large, efficiently staffed, and well-conducted institution. Nevertheless, institutional life is by no means essential, and thoroughly efficient treatment can often be undertaken in the patient's own home. For desiderata in an institution I would beg to refer to a memorandum I was asked to submit to the Departmental Committee on Tuberculosis (Cd. 6654, Appendix). With your permission I shall make a few observations under each of these headings, not intended to be in any sense complete, but rather as a general expression of opinion, and with the hope that discussion will be stimulated.

General Treatment.

The indications for and nature of general treatment are so well recognized that they scarcely need comment. On one point, however, I may request your attention for a moment. We are rather apt to regard private and institutional treatment as two distinct entities, but lessons learnt from the one may often be profitably applied to the other. In this respect I fear we who are responsible for the charge of institutions have been somewhat slow in making use of observations learned in private practice. Every general practitioner has realized the value of climatic change and the benefit to be derived from altered environment and altered conditions of life for certain of his patients. Such an observation we have been slow in putting into effect in institutional practice. And yet it may frequently be exceedingly useful in hospital work. I was fortunate in enlisting the sympathy of the Trustees of the Treloar Cripples' Hospital to this aspect of treatment in surgical tuberculosis, and this has resulted in the establishment of a branch hospital at Hayling Island for the treatment of our patients. The result has been remarkably encouraging. We are acquiring a mass of valuable information on the selection of cases for marine or inland treatment. Certain cases undoubtedly make better progress inland, others at the seaside. Others improve most rapidly by alternate periods of treatment at each.

A marine institution for the treatment of surgical tuberculous affections should possess certain characteristics which I would regard as indispensable if the best results are to be obtained. The climate should be bracing but mild, the rainfall slight, the air clear and free from mist and other contamination. The soil should be dry and sandy. There should be abundant sunshine of high actinic value, the benefit of which is enhanced by reflection of light from the sea. The hospital should be so situated that it is right on the seashore and of easy access to the beach. The shore should be flat for the convenience of the patients, there should be an extensive beach on which treatment may be undertaken unhampered by visitors and others. There should be considerable tidal excursion. All these desiderata are present at Hayling, and treatment at Alton has been immensely benefited by the possession of these added advantages.

Patients are especially helped who, having improved up to a certain point, then remain stationary and need an added impulse to further promote the cure. There are also numerous special indications. Intensive heliotherapy with sea-bathing to assist may be practised. This combined treatment is of especial value in sinus cases. As a general rule in the summer I send down as many ambulant patients as possible to enjoy the delights of the beach, in the winter the proportion of recumbent cases is higher. In addition the life is made as different as possible, the menu is altered, times of meals changed, and everything possible done to further alter the patients' environment. I am of opinion that this scheme of treatment might usefully be imitated by other similar institutions.

Local Treatment.

While I have emphasized the importance of general treatment, because, perhaps, it has not been given the attention it demands, careful local treatment is of supreme importance.

It is required for the cure of the local lesion, the prevention or correction of deformity, and the management of complications, such as abscesses and sinuses. It involves minute attention to detail, is largely orthopaedic in nature, provided those limitations that the patient is tuberculous are ever borne in mind. Each case requires individual consideration, and presents its special problems; a set treatment is to be deprecated.

Speaking generally, for the more severe local lesions it may be said that there are three stages of local treatment, depending upon the progress of the disease: (1) Acute commencing and progressive disease, which requires absolute rest in the recumbent position, with immobility of the part attacked, combined with the adoption of special means to correct or prevent deformity and abolish muscular spasm. (2) The chronic or subacute stage, where recumbency may not be essential, but very complete immobilization of the local lesion is still called for to assist repair and prevent the recurrence or increase of deformity. (3) The stage of convalescence, where complete immobility is no longer required but protection or support by light accurately fitted removable splints, which may be discarded when the patient is at rest, will suffice.

These three stages during which treatment is required are of indefinitely varying duration, depending upon numerous factors, such as the site and extent of the lesion, the virulence of the infection, individual power of resistance and repair, presence or absence of other lesions, age of the patient, conditions under which treatment is conducted, etc. Abscesses, if present, should where possible be evacuated by aspiration with careful technique.

A closed tuberculous abscess is generally harmless; indeed, is sometimes welcome. The danger of such an abscess does not lie in its tuberculous infection, but rather in the possibility that unless due precautions be observed it may become secondarily infected. Then the clinical picture changes, fever supervenes, and the prognosis becomes grave.

May I illustrate my remarks on local treatment by reference to a case of acute tuberculous disease of the hip-joint with deformity? The patient, I assume, is receiving open-air treatment under the best available climatic conditions, as that is altogether advantageous from both humanitarian and economic considerations. While treated he is being educated and occupied to relieve the monotony of necessarily long-enforced recumbency. The patient is recumbent and immobilized on a suitable bed on a firm mattress. Extension is applied to the affected limb, which, if necessary, is first flexed until there is no lordosis, and placed in such a position that the two anterior superior iliac spines are on the same horizontal plane and the straight line joining them is at right angles to the long axis of the trunk. This extension is continued until the deformity is corrected and the affected limb is not only fully extended but preferably arrives at a position of slight abduction. As a general rule it should be our endeavour to obtain cure with movement. If that be our aim it is desirable to continue extension until muscular spasm has completely disappeared. A late sign of muscular spasm[4] secondary to tuberculous disease of the hip-joint may be detected as follows: the leg on the affected side is gently internally or externally rotated to its extreme limit; if then a further sharp light rotatory movement be conveyed to the limb, reflex spasm of the abdominal recti is demonstrable if the disease is still active.

This is a clinical sign of great practical value. If absent there is reasonable presumption of inactivity of the local lesion, and confirmatory evidence of value may often be obtained by *x*-ray examination. The outline of the bones forming the hip-joint is clear and well defined, recalcification has occurred, a striking contrast to the picture in active hip disease.

The patient may now be safely allowed ambulatory treatment in a short, well-applied plaster spica with crutches and patten, to be substituted some three months later, if no signs of reactivity have occurred, by an accurately fitting celluloid splint, which may be removed at night. This would be suitable local treatment in a large proportion of cases of hip disease. Should there be much intra-articular destruction accompanied by persistent cachexia, sound bony ankylosis may be preferred, and is more readily obtained by prolonged plaster fixation at an earlier stage in a selected position.

A single Thomas hip-splint is now generally—and I think rightly—regarded as an unsuitable appliance in tuberculous disease of the hip-joint. Should there be abscess formation, aspiration is the treatment of choice. The site of entry of the cannula should be selected with care, should be remote from the direction in which the abscess is extending, the cannula should pass through a substantial layer of healthy tissue, and should so penetrate the abscess wall that the orifice created becomes a closed valve when the cannula is withdrawn. These are precautions for the avoidance of subsequent sinus formation which common sense dictates. Neglect of these leads inevitably to disappointment in the conservative treatment of tuberculous abscesses of bony origin. Should the pus be caseous, it may generally be liquefied *in situ* by the employment of suitable modifying fluids.

Sinus formation is the most serious complication to avoid in the treatment of tuberculous bone and joint disease. If a sinus is present but uninfected, the most scrupulous care should be taken to avoid secondary infection and secure healing. If infected, free drainage is called for and the immediate use of autogenous vaccines is strongly advocated. Sequestrotomy is often desirable if an infected bony sequestrum exists, but great care should be taken to avoid undue injury, and further spread of infection, in its removal.

Alteration of posture to ensure better drainage, and ambulatory treatment with the same object, is often of value if the disease is not too acute.

Should the sinus be a chronic one of long standing, without extensive bony infection at its source, the therapeutic injection of Beck's bismuth paste is frequently successful. Heliotherapy, balneotherapy, and *x*-ray treatment are of immense assistance in suitably selected cases; there are special indications for the employment of each, separately or combined. Vaccines, in my experience, are only of value for very recent infections, but in these are of the greatest possible use. The general principles of treatment here laid down for hip disease are of equal significance in other tuberculous bone or joint infections.

Adjuvant Treatment.

Under this heading I would include methods which comparatively recently have come into considerable prominence, which depend for their effect on reactions provoked which may be controlled and utilized to the advantage of the patient treated, and which represent certainly the most interesting and probably the most important therapeutic advance in the treatment of all forms of surgical tuberculosis made of late years. Their application demands skill, experience, and judgement if the best results are to be obtained. They represent alternative and often shorter routes of procuring the desired end, and in certain cases afford means of ensuring successful treatment of really supreme value. They may be employed in suitable cases separately or in combination during, or at some period in, the treatment of bone and joint tuberculosis. The indications for their use are variable, according to the nature of the lesion and individual peculiarities of the patient treated. Such adjuvant measures include heliotherapy, *x* rays and other electrical methods of treatment, balneotherapy, vaccine treatment, and chemiotherapy. None are indispensable for obtaining cure, but their judicious employment often markedly assists and accelerates cure.

Of these, heliotherapy,[5] or sun treatment, may be selected as an example. It has attracted considerable and increasing attention. A bulky literature has been developed concerning this method of treatment, and while perhaps practised more on the Continent than in this country, it has a large and steadily increasing number of advocates, both in England and America. For practical purposes we may regard the action of sunlight on a tuberculous patient as being beneficial in one of two ways:

1. By exercising a local or direct action which is applicable to any patient on any superficial tuberculous lesion. Sunlight is bactericidal, and its bactericidal action is assisted by the favourable inflammatory response which suitable exposure provokes. Ultra-violet radiation has very little penetrative power, and its direct action is therefore confined to the surface, deep-seated lesions not being directly affected. The direct action is therefore limited to superficial ulcerations and the various forms of cutaneous tuberculosis.

2. More interesting, more difficult to explain, and more valuable is the remote or indirect effect of sunlight. It appears to be intimately associated with the patient's own power of pigmenting. Skin pigmentation is dependent upon exposure to sunlight, *plus* some inherent property peculiar to the individual exposed and varying in different persons. Equal exposure to the same source of light in different patients produces varying results. In some, pigment is easily and quickly formed; in others, obtained with difficulty; in others still, it is not obtainable at all. Ultra-violet rays of the wave-length of those in sunlight appear to be most suitable for the induction of pigment. Those of shorter wave-length obtained from artificial sources are apparently more dangerous and less effective. Pigment once formed appears to have two effects: it has a protective rôle and permits prolonged exposure to light and air without danger, and it has been suggested that it has a transforming faculty, converting the physical energy of sunlight into chemical energy which can be made use of in the body on the analogy of the chlorophyll pigment of the plant.

The latter theory is pure supposition and not as yet capable of satisfactory proof. It is, however, certain that for the indirect advantages of sun treatment to be obtained pigmentation is essential. In general terms, the greater the area pigmented and the longer exposure can be comfortably maintained the greater appear to be the benefits derived. Interest in natural heliotherapy is due to a large extent to Rollier's investigations and practical demonstration of its value. It is difficult to ascribe what proportion

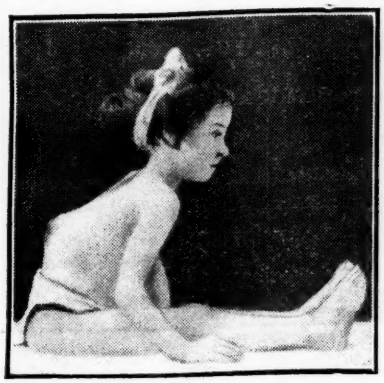

Fig. 1.—Patient suffering from tuberculous disease of the spine, with extreme deformity and double psoas and dorsal abscess, all intercommunicating; before treatment.

Fig 2.—The same patient after treatment.

Fig. 5.—Patient suffering from tuberculous disease of the knee-joint with numerous sinuses.

Fig. 6.—The same patient after treatment; full movement returned.

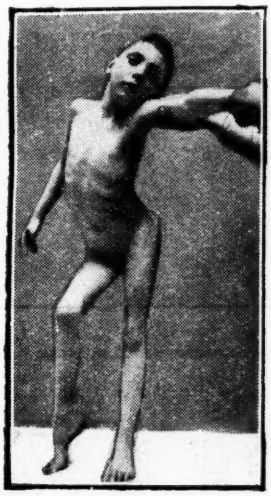

Fig. 3.—Patient suffering from tuberculous disease of the hip-joint with deformity; before treatment.

Fig. 4.—The same patient after treatment: movement has returned.

Fig. 8.—The same patient (Fig. 7) during treatment: sea-bathing at Hayling Island. Patient shown supported in the sea by porter on the left-hand side of the illustration. The child on the right is suffering from tuberculous disease of both hip-joints with numerous septic sinuses.

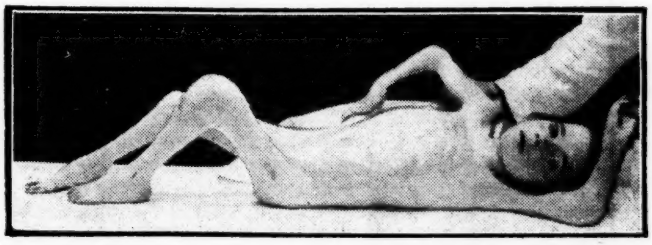

Fig. 7.—Patient formerly under the care of Dr. Clive Riviere for pulmonary tuberculosis in whom general dissemination had occurred. The following lesions developed: Cranial caries, cervical adenitis, tuberculous disease of both elbows, both wrists, both hips, both knees, both ankles, severe mesenteric tubercle with threatened intestinal obstruction; numerous abscesses and sinuses.

Fig. 9.—Dr. Clive Riviere's patient to-day. The white bands round the left leg are areas of skin shaded by splint worn.

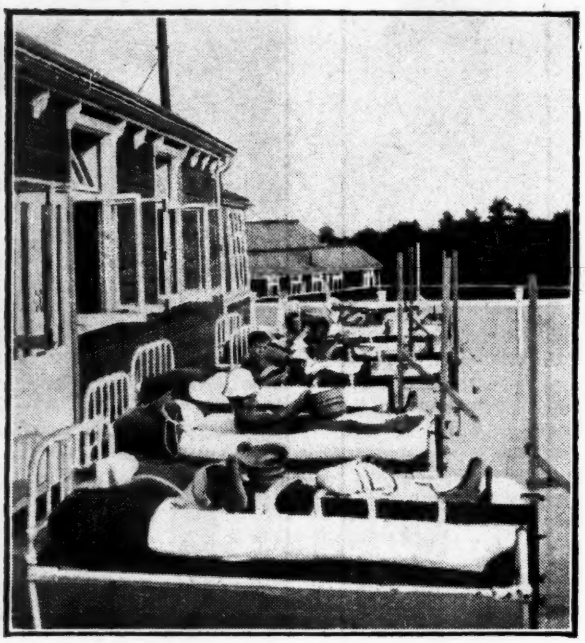

FIG. 10.—Heliotherapy for recumbent patients at Alton, who are seen basket-making. A corner of one of the solaria.

FIG. 11.—Heliotherapy for ambulant patients. Amongst the wild flowers at Alton.

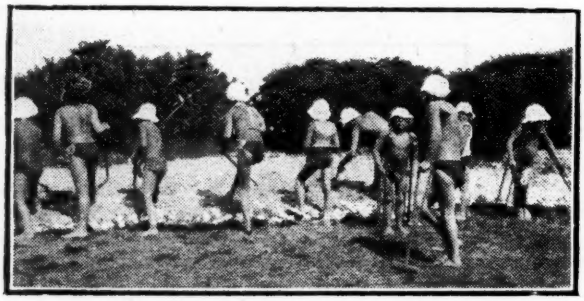

FIG. 12.—Heliotherapy at Hayling Island. Ambulant patients gardening. From left to right the patients are suffering from (1) knee tubercle; (2) multiple tuberculous lesions; (3) knee tubercle; (4) shoulder tubercle; (5) spinal caries; (6) multiple tuberculous lesions; (7) double spinal caries with double psoas abscesses and tuberculous disease of both hips, with numerous infected sinuses; (8) tubercle of right hip; (9) spinal caries; (10) knee tubercle. All these patients had abscesses or sinuses, many had both. Note the excellent general condition and muscular development.

FIG. 13.—Ambulant cases about to bathe.

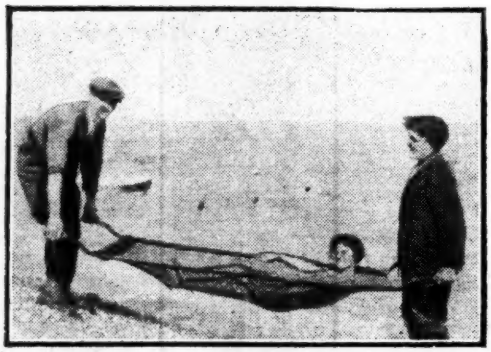

FIG. 14.—Recumbent case about to bathe. Patient suffering from tuberculous disease of right hip and left shoulder, abscesses with each lesion.

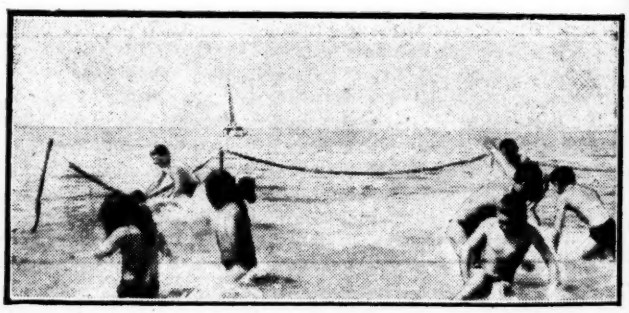

FIG. 15.—Ambulant patients bathing.

of the benefit obtained from insolation is due to the actual effect of sunlight and to mere exposure to open air under favourable conditions, but that the sun is directly responsible for some of the benefit is clinically demonstrable by the varying behaviour of pigmenting and non-pigmenting patients treated under identical conditions of fresh air, but with or without direct sunlight. In English institutions also the contrast between the appearance of patients during the winter months, when insolation is not possible, and during the summer, when it is available, is in suitable cases striking in the extreme.

An extended research is now being undertaken at Alton with the assistance of the Medical Research Council and under the guidance of Professor Leonard Hill. At present the effect of heliotherapy on general nutrition and metabolism is particularly being investigated by Dr. Campbell. One of his experiments I here quote in his own words and with his kind permission. "Two batches of six children, one of individuals who had pigmented well, and the other of individuals who did not pigment well, gave the results shown in the subjoined table. The experimental conditions as regards food, time of observation, and cooling power of the atmosphere as measured by Dr. Leonard Hill's kata-thermometer, were similar for each group.

The children who pigmented well show average weight and nutrition, which when compared with standard figures for normal children of the same age indoors may be classed as high; on the other hand, the children who did not pigment well are about standard. As regards heat production, although of slightly younger age the former show a higher average figure (1,550 kilocalories per diem) than the latter (1,323 kilocalories per diem). All the children were on hospital diet and most of them fixed in splints in bed. The standard figures for basal metabolism—that is, when the subject is at rest and in the post-absorptive condition—is about 1,100 kilocalories per diem at the age of 12 years. If one allows 20 per cent.—a liberal allowance under the conditions—for the influence of food, the normal standard becomes about 1,320 kilocalories, the figure given in the table. It is a point of interest and of the present research to determine what effects are produced by exposure to the open air and by exposure to the sun. Experiments already completed on healthy adults show that exposure to open air conditions increases metabolism quite apart from exposure to the sun."

Dr. Campbell's Table.

Subjects.	Number of Observations.	Average age: Years.	Average Weight: Kilograms.	Average Height: Centimetres.	Average Surface Area: Sq. Metres.	Average Heat Production: Kilocalories per Diem.
Six children who pigmented well	18	11.6	32.4	138	1.10	1,550
Six children who did not pigment well	21	12 3	27.2	141	1.05	1,323
Standard for normal children	—	12.0	30.0	140	1.15	1,320

Sunlight has great psychological value in treatment. It stimulates and exhilarates after suitable exposure. Prolonged exposure, on the other hand, is harmful, even before it reaches the stage of actual sunstroke. Graduated exposure, therefore, should be enforced, the patient's tolerance to light treatment ascertained and gradually increased. With the improving metabolism, blood changes may be noted. The number of red cells and the amount of haemoglobin is said to increase, a leucocytosis often replaces a leucopenia. According to Rollier, insolation has an analgesic action, the respiration rate is diminished, but the amplitude increased, there is an increased excretion of toxic products. On local lesions, sinuses frequently at first discharge more freely, the discharge becoming more serous and less purulent, finally the sinus frequently healing. Sequestra are sometimes spontaneously extruded. The return of mobility of affected joints is hastened. Skin lesions especially heal more rapidly; in short, insolation accelerates and consolidates the cure. The favourable clinical effects observed are being now systematically investigated at Alton, as previously mentioned.

Balneotherapy.

Insolation, with associated aerotherapy, constitute important and well recognized accelerating agents in effecting cure. Combined with sea-bathing and paddling, their value is enhanced to a truly remarkable extent. Without detailing the local benefits obtainable, the increased metabolic activity following properly managed and timed balneotherapy is clinically obvious in the improved appearance, mentality, general nutrition, and muscular development of patients selected for this treatment at Hayling Island. The extent of the improvement is now being measured by Professor Leonard Hill and Dr. Campbell in terms of metabolic activity, and the figures they will publish later will furnish exact evidence of the value and importance of this combined adjuvant treatment. Meantime, the urgent need for the knowledge of this method of treatment, so eminently suitable for and so readily available to English sufferers, justifies an anticipation of detailed reports to follow on a method of treatment applicable in the highest degree on our own shores, the value of which we have been so slow to appreciate.

Conclusion.

It is of interest to recall to-day that when this subject was last discussed at the annual meeting of the British Medical Association, in 1912, Sir Harold Stiles[6] entered a strong and able plea for radical measures in treatment. In urban hospitals there may be some justification for this, but in the specially designed and equipped country hospitals which are arising throughout the country facilities for utilizing the various methods of treatment I have mentioned are available, and the modern tendency is to permit less and less primary surgical interference. To-day radical measures are rarely called for in the treatment of tuberculous bone and joint disease in children, and as the indication for their employment has diminished, so the results, both as regards ultimate mortality and from orthopaedic considerations, have improved. The lowered mortality is striking and worthy of record, but not less remarkable is the improvement in orthopaedic results. Mr. Elmslie has remarked on this by a comparison of the condition of London cripple school children observed some years ago and noted recently. In over 2,000 cases treated to a conclusion at Alton the mortality during treatment was under 2.5 per cent.

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DISCUSSION.

Mr. John Fraser (Surgeon, Children's Hospital, Edinburgh) said: Before passing any comment on the question of the treatment of tuberculous diseases of the bones and joints in children I should like to draw your attention to one point which I think may be of considerable pathological interest. I allude to those cases which are really a combination of tuberculosis and syphilis. Some time ago a good deal of interest was aroused regarding the type of tuberculous disease which occurs in the centre of the diaphysis of a long bone. The interest chiefly centred round the fact that the "locale" was so different from that met with in ordinary tuberculous disease situated at the metaphysis. I have come to the conclusion that the diaphyseal type of infection is always an example of a mixed infection of syphilis and tuberculosis. The specific infection is the primary error, being congenital, and it is apparently responsible for a vascular change at the subdivision of the nutrient vessel; secondary to the vascular change the deposit of tubercle arises.

Mr. Fraser alluded to the histological aspects of the disease, the very remarkable hyperostosis which occurred, and the curious central sequestrum formation. He exhibited lantern slides in illustration of the points.

In regard to treatment, Mr. Fraser said that he was thoroughly in agreement with all that Sir Henry Gauvain had said, but one must remember that the circumstances varied considerably in different localities. He felt confident that no one would dream of operating on a tuberculous bone or joint focus so long as conservative treatment held any prospect of success. He pointed out, however, that under certain social conditions operation might offer the best results, both immediate and in the future. He deplored the very insufficient accommodation for the institutional treatment of bone and joint tuberculosis which at present existed, and he hoped that the Legislature of the future would do something to correct this very real deficiency.

Sir Henry Gauvain had criticized to some extent the views of Sir Harold Stiles as expressed in the British Medical Association Meeting in 1912, but Sir Henry must remember that Sir Harold Stiles's work was carried out under conditions in which it was exceedingly difficult to arrange for prolonged conservative treatment.

Mr. Fraser further alluded to two other aspects of the treatment—to the combined heliotherapy and congestive treatment which is at present on trial in Germany, and to the results which have been obtained in the Edinburgh Children's Hospital by the use of detoxicated tuberculin.

Dr. Camac Wilkinson (London) said: Bone tuberculosis is held to be a form of surgical tuberculosis; and so it is, as soon as surgical complications needing surgical procedures have arisen, but no sooner. Till then it is the clear duty of all to strive to avert those sequelae which, despite the surgeon, may end in tragedy. There has been a tendency to surrender passively the early stages of bone tuberculosis to the surgeon. For the last thirty years I have done my best to dispossess the surgeon of this field of medical activity, and in some cases I have succeeded in modifying the diagnosis or in securing results denied to the surgeon after a long trial of his measures. A real knowledge of the nature of the tuberculous process—whether in bone or elsewhere—should convince any one that it is risky to attempt to "cut out or away" tuberculous tissue or areas.

In the future our hope lies rather in turning, not to the surgeon, but to the general practitioner, who has the best and earliest and most opportunities of intervening at the very earliest stage, when not only the tragic sequelae of bone tuberculosis but even bone tuberculosis itself may be prevented. The general practitioner stands upon a vantage ground which dominates the whole field of tuberculosis, because he is the chief, chosen, and trusted "guide, philosopher, and friend" of the family circle in medical affairs. If early diagnosis be our aim, the real solution of the tuberculosis problem surely begins and continues in the family, and, as a corollary, general practice is an indispensable preparation, and yields invaluable experience in the evolution of the ideal tuberculosis officer. This was my view before the Insurance Act was passed, and experience has greatly strengthened this view.

It was a retrograde step to appoint tuberculosis officers associated with the Public Health Department. Far better would it be that general practitioners who had studied tuberculosis in actual practice should be selected as part-time tuberculosis officers. I am offering the general practitioner no easy task. The study of tuberculosis will always be difficult and laborious, and the general practitioner might find that he had more than he could do. This kind of work would pay him well, and the labourer is worthy of his hire. Remember that Rudyard Kipling tells us that "if you give any man anything that he has not painfully earned for himself you infallibly make him or his descendants your devoted enemies." I now proceed to elaborate this thesis, with the general practitioner, possessing knowledge, "painfully earned for himself," ever watchful, resourceful, patient, courageous, as the central figure and guiding spirit in the crusade against tuberculosis in the family.

As a bacteriologist I must concentrate upon the specific cause, its nature, its source, and its migrations. Two outstanding features of bone tuberculosis deserve special attention. Bone tuberculosis is chiefly associated with the tubercle bacillus of the human type. This fact proves that the original source of bone infection is man himself suffering from open tuberculosis, usually of the lungs; and these human tubercle bacilli carriers spread infection in the home and infect the children. The first line of defence (A) is in the family, the general practitioner is the officer in charge. Bone tuberculosis is practically never the primary tuberculous lesion. Elsewhere, at a distance, recently or long ago, there has been a primary infection, most often in the bronchial glands or lungs or both, a cryptic focus of tuberculous disease, whence tubercle may spread to distant parts, such as bones. The bronchial glands form the second line of defence (B) When this line of defence fails, bone tuberculosis may occur The bone forms the third line of defence (C). Thus the migrations of the tubercle bacilli indicate the three essential lines of defence (A, B, and C) in the home, in the bronchial glands, and in the bone.

(A) *First Line of Defence.*

To prevent bone tuberculosis in children with its tragic consequences, we must protect the child from risk of infection from human tubercle bacilli carriers who expel tubercle bacilli into the air. Needless to say, measures to protect children in the family circle are often perfunctory, inadequate, and illusory. Segregation of all carriers is of the first importance, not compulsory segregation at institutions, but at first voluntary segregation in the family may be sufficient. Meanwhile all carriers must be treated. There are actual and potential carriers. The aim of treatment is to convert all infectious cases into non-infectious cases and to prevent non-infectious cases becoming infectious.

Lastly, whenever actual carriers are found in a family, all members of the family should be tested thoroughly with tuberculin once a year, and whoever reacts with certainty is a potential carrier and should be treated with tuberculin. The testing with tuberculin is an accurate means of calculating the success or failure of segregation and other measures of prophylaxis. There is no other way of controlling measures of prevention. Tuberculin skilfully used in the family for prevention and treatment is far more effective than the best sanatorium measures, because it can be applied to the majority of sufferers immediately and on the spot; it attacks the disease directly, and it can be applied over and over again at a relatively small cost.

(B) *Second Line of Defence.*

When infection has occurred and tubercle bacilli have reached the bronchial glands by the air route, we have to face a graver situation. The early stage of bronchial tuberculosis oftentimes causes no signs or symptoms, and may long remain a latent lesion. The early diagnosis of bronchial tuberculosis is just a matter of guessing, unless tuberculin is used for testing. Agglutination tests avail not, nor opsonic indices, nor other blood tests. Tuberculin is the one and only means, and its administration is both safe and simple. With it the answer is definitely and decisively Yes or No. The "Yes-No" diagnosis should have no place in medicine. Once the diagnosis is settled by tuberculin, it is easy to arrest and cure bronchial tuberculosis with tuberculin used on well-tried and well-proven lines. The cure of bronchial tuberculosis is tantamount to the prevention of bone tuberculosis. Thus the risk of bone tuberculosis is much diminished. The bronchial glands constitute the second line of defence; and again the family physician must be on the *qui vive*.

(C) *Third Line of Defence.*

If the second line of defence gives way, bone tuberculosis may become a *fait accompli*. Even early bone tuberculosis may cause no signs or symptoms for some time. Again tuberculin may be the only weapon to clinch the diagnosis. If the tuberculin test answers "Yes," there is still hope that tuberculin used as a remedy may arrest the disease and prevent those tragic sequelae which make homes for cripples a sad necessity.

The success of the general scheme I have here outlined depends essentially upon two conditions: (1) That tuberculin is a safe and trustworthy means of determining the early diagnosis of tuberculosis, both in bone and elsewhere; and (2) that tuberculin used as a remedy in the manner that I have recommended—after a close, careful and continuous study for thirty years—secures greater and more lasting successes than any or every other known method.

Mr. A. H. TUBBY (London) congratulated Sir Henry Gauvain on his graphic address and on the valuable work achieved at the Treloar Hospital at Alton. Whilst it was now generally accepted that surgical or external tuberculosis was most efficiently treated by the "climate and rest method," yet such was not always the case, and a conflict of opinion prevailed for some years. As one of the protagonists in this matter, Mr. Tubby trusted he might be pardoned if he introduced a personal note, indicative of the stages by which they had arrived at definite conclusions.

When he was in the late Professor von Volkmann's clinic at Halle in 1888 he saw a tuberculous child being placed on the operating table for the thirty-fifth time. This and numerous other cases in that clinic raised doubts in his mind as to the rationale of operating. Some years' additional experience at the Evelina Hospital for Children and as consulting surgeon to the Hip Hospital at Sevenoaks left him deeper in doubt. And, by way of parenthesis, it might be remarked that the latter hospital was one of the two or three pioneer hospitals in this country of the "climate and rest" treatment, and even of heliotherapy. About the year 1900, Dr. (now Sir) Dawson Williams drew the speaker's attention to some pamphlets sent from America advocating conservative measures, and Mr. Tubby then instituted statistical inquiries at the London children's hospitals, and contrasted them with the results obtained at Sevenoaks. At that time operations for surgical tuberculosis were generally practised in the London hospitals, and the conservative methods were carried out at Sevenoaks. There was no doubt that the practice at the country hospital was productive of better results than in the urban hospitals. The conservative treatment was brought before the profession in some articles in the BRITISH MEDICAL JOURNAL. The next step was to initiate a discussion on the whole question at the then newly instituted Society for the Study of Disease in Children. Opinion in that society in 1903 was so divided that some of the "operating" section contemplated leaving the society if it pursued the matter further, officially. The title of the speaker's opening paper was, "Is the urban hospital treatment of external or surgical tuberculosis justifiable?"

In 1912, however, a discussion took place in the Section for the Study of Disease in Children of the Royal Society of Medicine on the treatment of surgical tuberculosis in children, and it was opened by a paper by Mr. Tubby. The net result of the discussion was that those who had strongly advocated, nine years previously, the operative treatment now proved to be firm advocates of conservative methods. It was evident that the good work done at Sevenoaks, Margate, and Alton had proved the means of their conversion. When Sir W. Treloar founded the Cripples' Hospital at Alton, so little was the important part which tuberculosis played in crippling children understood that no adequate provision had been made for the treatment of that disease; and it was not until the speaker pointed out to one of the trustees that two-thirds of the then cripples owed their disability and deformity to tuberculosis that suitable measures were taken to grapple with the problem in that institution.

The original attitude of the Departmental Committee under the Insurance Act was a further proof of the prevalent ignorance on the subject. It was not until attention was drawn to the point in the *Times* by the late Mr. Clement Lucas and others that the scope of the inquiry was extended to tuberculosis in children and evidence invited from Mr. Tubby and others. He was permitted to submit to the Committee a comprehensive scheme dealing with this matter.

He must, he said, apologize for the intrusion of these personal reminiscences, but they illustrated how hardly won was our present position in the matter of the recognition of the importance of conservative treatment of surgical tuberculosis. As an addendum to his remarks, Mr. Tubby desired to hear Dr. Camac Wilkinson's opinion as to the value of tuberculin in non-suppurating bone tuberculosis.

Mr. LOCKHART STEPHENS (Emsworth) considered that the general practitioner was responsible for the awful late results. Open air and sunlight cost nothing, and were applicable even in humble surroundings. Large costly institutions were only necessary for grouped cases, as in a county scheme. Alton and Hayling Island should be seen by every general practitioner.

Mr. F. C. PYBUS (Newcastle-on-Tyne) said that the present amount of tuberculosis was a social blot, but, like all preventable diseases, had become a matter for health authorities and administration. It was also a social blot that provision had not been made for the treatment of surgical tuberculosis. All were agreed that conservative treatment was proper, and that, given suitable conditions, most cases got well. Many surgeons, however, had to do the best they could with the means at their disposal, and most cases in the north had to be dealt with at the out-patient departments, and brought long distances by train. In many cases the parents had not house room for the necessary abduction or spinal frames, and some patients were taken off splints to be brought to hospital. In his opinion the single Thomas splint was unsatisfactory, as it failed to prevent flexion or adduction.

Operative measures often had to be performed as being the best under the circumstances. These included the removal of local bone foci, subperiosteal resections, and the removal of sequestra from joints. These were only performed after the failure of conservative measures. Abscesses were treated radically, great care being taken to prevent infection of the wound by the contents of the abscess.

At least 50 per cent. of the cases were bovine infections, and therefore to prevent successive generations of affected cases the milk supply required control. Surgical tubercle formed, he believed, 30 per cent. of cases in the Children's Hospital. The present schemes for open-air hospitals were held up owing to financial stringency, and this was always the way in health measures. Alton Hospital should, he said, be known everywhere to stimulate public authorities to do likewise.

Dr. H. SCURFIELD asked if Sir Henry Gauvain could give a rough idea of the proportion of cases in which cripples could be turned into useful sound citizens by Alton methods. He thought if local authorities and the public knew the wonderful results obtained by modern conservative treatment of surgical tuberculosis the necessary institutions would soon be available.

Dr. GERTRUDE HERZFELD (Edinburgh) emphasized the importance of the prevalence of bovine infection rather than human, as shown in Edinburgh by Sir Harold Stiles and Mr. John Fraser. In the out-patient department of the Sick Children's Hospital some hundreds of cases of surgical tuberculosis were seen annually, and only a very small proportion gave a family history of tuberculosis. In the large majority the milk was the source of infection, and it was there she considered that they must go for prevention. She agreed with Mr. Pybus as to the inefficiency of the Thomas hip splint.

Dr. T. HARTLEY MARTIN (Liverpool) said that the Liverpool Hospital for Children, Leasowe, had 240 beds for the treatment of non-pulmonary tuberculosis in children. Since 1914, 84 per cent. of the cases had been discharged with the disease arrested. All cases were kept under rigid care after discharge. In 1919 84 cases were discharged. At the present time 80 were still under after-care observation, 75 of whom were still absolutely fit, five relapsed and were readmitted to hospital, four being cases of tuberculous peritonitis and one tuberculous adenitis (diffuse foci). In only 12 per cent. of the cases of pulmonary tuberculosis admitted to hospital was there any definite family history of the disease.

Mr. MCCRAE AITKEN (London) said that one of the most satisfactory points in the discussion was the absolute unanimity of opinion that bone and joint tubercle must be treated by conservative means. As an old pupil of Sir Robert Jones he had been twenty years associated with this work. When he left Edinburgh he believed that tubercle of joints ended in amputation sooner or later. In 1897 the first three operations he ever saw furnished a beautiful demonstration of three stages of tubercle of the knee-joint. Within seven years he saw all those three limbs amputated. In those days Thomas's walking calliper was unknown in Edinburgh.

In 1901 he passed to Liverpool, and the first patient he saw in Sir Robert Jones's out-patient clinic was a boy with an enormous tuberculous knee riddled with sinuses. When he said, "I suppose you will excise this, sir?" the reply received was a vociferous "No; bring a walking calliper splint." In those days there were no open-air homes; the boy was treated as an out-patient, and he recovered with a movable knee.

General practitioners and surgeons without open-air facilities might take heart from the fact that twenty years ago these patients were treated as out-patients, not as in-patients, by Robert Jones, and good results were obtained. In 1901 the beginnings were made of the open-air hospital at Baschurch, and the results were very striking. For those who might build he urged sleeping in the open air. None of the wards in Shropshire or at Eastcote had more than three walls.

One of the striking features was the way a miserable slum child recovered its appetite for breakfast. In this connexion they had had to fight the question of food during the war, for unlimited butter, fat, and sugar was an essential part of the treatment.

Dr. Camac Wilkinson, in reply, said that the best answer he could give Mr. Tubby was by showing some charts which he had brought to illustrate the value of tuberculin in diagnosis. One case seen with Sir Alfred Fripp and Dr. Whitcombe, had a sinus under the clavicle of two or three years' duration, probably connected with the acromion process, and had a typical reaction to tuberculin. He was treated with tuberculin in increasing doses till 1 c.cm. old tuberculin was given without any reaction. In about four months the sinus closed and the ulcer healed, forming a beautifully smooth, almost invisible, scar. This was in 1911, and there had been no recurrence.

He had had many similar cases connected with glands and one extraordinary case was a woman who had suffered from tuberculosis of the hip for more than ten years. She had eight sinuses, with abundant discharge from all. The temperature ranged from 99.4° to 100°; the weight was 7st. 13½ lb. Under tuberculin five sinuses healed within a year, and she had no ache or pain, while when she came to the dispensary morphine had to be given every night and the woman pleaded to the doctor for amputation or anything else to check the pain. She came to the dispensary twice a week from Watford (twenty miles) and made great and steady progress. Her weight in February, 1913, was 9 st. 7 lb. The largest dose given was 4 c.cm. T.E., and this caused no reaction at all.

Upon the question of the relative incidence of the human and bovine types respectively of tubercle bacilli in bone tuberculosis he asked those who disagreed with him to study carefully the exhaustive analysis made by Oehlecker and Steffenhagen and published in the *Tuberculose-Arbeiten aus dem K.K. Gesundheitsamte*, Berlin. There were but few experts equal to work of this kind, as it needed much time and skill in experiments on animals. According to Oehlecker, morphological, cultural, and pathogenic characters in guinea-pigs, rabbits, and bovines showed that in a series of twenty-six cases the bovine type was found only once in a child. When all trustworthy records were collated and an average obtained, it would surely be found that although the relative incidence of these two types of tubercle bacilli might vary somewhat in different countries and places, bone tuberculosis even in children was much more frequently associated with the human than with the bovine type, and the measures of prophylaxis must be adapted to this scientific fact.

Sir Henry Gauvain, in reply, said that owing to the lateness of the hour it was not possible for him to answer all the questions raised in the discussion. He was very grateful for the generous reception which they have given to his remarks, and it was especially pleasing to know that conservative treatment of bone and joint tuberculous disease in children was in such general favour that the principles he had advocated had received unanimous approval. They had the evidence of the Chairman that since conservative treatment had been more generally adopted there had been very marked diminution of deformity in London school children. He quite agreed that the single Thomas hip-splint was an unsuitable appliance in tuberculous disease of the hip-joint, no one appliance was suitable for this condition in all its stages.

Dr. Camac Wilkinson had mentioned that German observers had shown that human infection very largely preponderated over bovine infection in bone and joint tuberculosis. Similar observations had been made in this country by Drs. Eastwood, Griffith, and Stanley Griffith, to whose writings he would refer. Out of over 100 consecutive examinations made of pus obtained from bone and joint cases at Alton, the patients being drawn from all parts of the South of England and of Wales, these observers showed that some 27 per cent. of the cases were bovine, a few atypical, and approximately 70 per cent. of human origin.

Mr. Tubby had long been an advocate of the conservative treatment of surgical tuberculosis in suitable country hospitals, and he (Sir Henry Gauvain) wished to record his gratitude to him for much encouragement given to himself in his own work at a time when such encouragement was much needed and hence doubly welcomed. The change in surgical opinion on this subject during recent years had been very marked. The results of treatment—and after all that was the final criterion—had fully justified the views they now held that conservative treatment was the most suitable for tuberculous bone and joint disease in children.

Resolution.

On the motion of Mr. A. H. Tubby, C.B., C.M.G., seconded by Dr. Harold Scurfield, the following resolution was unanimously adopted:

The Section of Orthopaedics and Diseases of Children desires to express to the Council of the British Medical Association their high opinion of the value of modern conservative treatment of surgical tuberculosis, and their realization of the necessity for the multiplication under the best climatic conditions of institutions similar to those already existing in various parts of the United Kingdom.

THE POLYARTICULAR MUSCLES AS THE CAUSE OF ARTHROGENETIC CONTRACTURES.

BY

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(*Abstract.*)

As inflamed joints are fixed by the surrounding muscles the polyarticular muscles undergo lengthening and shortening in movements of the neighbouring joints, the monarticular muscles do not. This may be the reason why in chronic arthritis the polyarticular muscles are better preserved than the monarticular. In the knee, for example, the rectus cruris is retained in front, the semimembranosus and semitendinosus muscles and the long head of the biceps at the back. This may explain why in chronic inflammations the knee, as well as other joints, tends to contracture in the direction of the pull of the surviving polyarticular muscles.

Osteogenesis Imperfecta.

Besides the characteristic changes of the long bones—fragility, translucency, etc.—and the defects in the skull, osteogenesis imperfecta may show dwarf symptoms (micromelia) and mechanical malformations (congenital lumbodorsal kyphosis and compression of the lower extremities against the abdomen), or, in other words, signs of infolding. The same complex of symptoms is manifest in other cases of osteogenesis imperfecta. Therefore they may have a common cause. The dwarfing of the extremities and signs of infolding are also present in achondroplasia and, though in a less degree, in mongoloid idiocy and cleidocranial dysostosis. In these conditions all symptoms find an explanation by assuming that direct pressure of too small an amniotic sac has produced the infolding in about the sixth, seventh, and eighth weeks of foetal life respectively; and enhanced indirect or hydrostatic pressure has produced the symmetrical growth-stunting of those tissues which were growing fastest at the moment the pressure acted. If evidence can be obtained that about this time in foetal life there is a period of relative rapidity in the development of bone, this may be a justification to add osteogenesis imperfecta to the chronological series of misdeeds of too small an amnion as is presented in *Feebleness of Growth and Congenital Dwarfism* (Oxford Medical Publications).

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BIRTH PARALYSIS.

BY

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The Pathogenesis of Birth Paralysis.

In discussing birth paralysis, or, alternatively, obstetrical or Erb's paralysis, may I state at the outset that we are concerned solely with that type of lower neuron paralysis of the upper limb which is seen in the newborn infant, and is due to a definite injury sustained during the process of delivery. This condition has long been known to obstetricians, and one of the earliest descriptions available is that of Smellie (1768). Duchenne[1] in 1872, from an investigation of the electrical reactions of the upper arm muscles in four infants, recognized the existence of a paralysis in this form of birth injury. Two years later Erb,[2] using the same methods in adults with a similar type of disability, postulated the existence of a lesion of the upper part of the brachial plexus at or about the junction of the anterior primary divisions of the fifth and sixth cervical roots. It was assumed at first that the plexus in the neck was injured by direct pressure, but later on from experimental work on the cadaver (Clarke,[3] Taylor and Prout, 1905), the view that the nerve trunks were stretched or torn during forcible separation of the head and shoulder was universally adopted. The findings of the operative exploration of the plexus in such cases in the hands of Kennedy of Glasgow,[4] and later Taylor[5] and Sharpe[6] in America, confirmed the experimental work as regards the localization and the varying degrees of the actual nerve injury. Until recently this conception of a supraclavicular injury of the brachial plexus as the underlying lesion in birth palsy was accepted without comment.

In the extensive literature which has grown up around this subject the number of reported operations on the plexus has been relatively small, because every authority has recognized the outstanding fact that the majority of patients show an early spontaneous recovery from the paralytic phenomena. This fact cannot be too often emphasized. Further, a good many of these infants are not placed under expert observation until such recovery is manifest. The comparatively transient nature of the paralysis in so many cases, and the well recognized tendency to the development of contractures of the limb, particularly in the shoulder region, are facts responsible for the appearance of the newer theories of pathogenesis. In 1910 Turner Thomas[7] of Philadelphia, and soon after him Lange[8] of Munich, stated that the early physical signs of birth palsy, and their mechanical sequelae, could be explained by the assumption of the existence of a primary injury of the capsule of the shoulder-joint. The immobility of the limb was to be looked upon, in their view, either as a pseudo-paralysis, or a true paralysis of a fleeting nature due to the secondary inclusion of nerve trunks in the region of the shoulder-joint. At about this time also Vulpius[9] of Heidelberg revived the old theory originally propounded by Küstner[10] in 1889, that a displacement of the upper epiphysis of the humerus was the essential cause of the symptoms and disability included under the term "birth paralysis." The shoulder-joint theory has been supported more recently by Ashhurst[11] of Philadelphia, and repeatedly with continued vigour by Turner Thomas himself. As a compromise the view that under the heading of birth palsy are to be included at least two distinct varieties of lesion, producing in the later stages identical mechanical disabilities, has been advanced by a number of observers (Van Neck,[12] Peltesohn,[13] Biesalski,[14] Rosenfeld[15]).

It must be stated that these alternative conceptions of the pathogenesis of birth palsy have not as yet received general commendation. It will be impossible in the limits of this paper to elaborate in full detail the evidence in favour of the various schools. This was dealt with comparatively fully in the discussion on this subject before the British Orthopaedic Association in November, 1919, by Fairbank[16] and the writer.[17] One may summarize the position in this controversy as follows:

1. Clinical, experimental, and operative evidence is all in favour of the view that in the majority of cases of birth paralysis there is a supraclavicular lesion of the brachial plexus, the degree and localization of the injury varying within considerable limits. In the majority of cases the actual nerve lesion is of the incomplete anatomical type and is followed by the occurrence of unhindered spontaneous regeneration. In a few cases—and comparatively few—the injury of one or more trunks is of a higher grade, so that insuperable obstacles to the occurrence of spontaneous regeneration are present. The localization of this type of injury is often in the region of the origin of the nerve roots from the spinal cord.

2. There is a certain amount of evidence in favour of the view that a primary injury of the shoulder-joint capsule, with secondary involvement of certain terminal branches of the brachial plexus, may occur in a small proportion of cases which demonstrate all the clinical features of typical birth palsy. There is, however, only one recorded case of a demonstration at operation of the actual nerve injury in the axilla (Lange).

3. There is little, if any, authoritative evidence to support the view that in any case of birth palsy an injury of the upper epiphysis of the humerus can be assumed or proved.

Etiology.

The various general etiological factors demand brief reference only. The majority of cases of birth paralysis are seen in infants born after a prolonged and difficult labour, in which there has been a disproportion between the size of the child and the maternal pelvis. From the statistics available of a large number of recorded cases, it is seen that vertex presentations outnumber breech presentations in the proportion of about 4 to 1. Occasionally other associated traumatic lesions are discovered, such as sterno-mastoid "haematoma," fractures of the humerus or clavicle; these simply point to the degree of violence which has been a necessary accompaniment of the successful delivery of the infant.

Symptomatology.

Early Stages.—In the newborn infant the immobility of the limb, together with the characteristic posture, form a well known clinical picture, and one which it is unnecessary to describe in full detail. In some cases swelling and tenderness localized to the supraclavicular region on the affected side can be demonstrated, and the infant often resists all efforts at examination and manipulation of the limb. Such local signs of trauma are, however, usually short-lived. In connexion with the neurological syndrome it is to be remembered that three clinical types are distinguished, namely, "upper arm," "whole arm," and "lower arm" paralyses.

Later Stages.—If the condition is untreated from this stage onwards one of two things may happen. A considerable degree of spontaneous recovery may occur, as manifested by the steady return of active power in the limb. Such recovery after weeks or months may prove to be complete as regards the actual paralysis, in that voluntary power returns in all the components of the muscle groups affected. On the other hand, this recovery may be incomplete, leaving a residual palsy which is commonly seen to affect the distal part of the limb—for instance, the extensor muscles of the wrist, fingers, and thumb. Whether such spontaneous recovery be slow or rapid, complete or incomplete, in the majority of cases a mechanical obstacle to the full function of the limb will now be evident—namely, the presence of an internal twist of the whole arm, best marked at the shoulder-joint, but often demonstrable in the forearm as a pronation contracture. Associated with the shoulder-joint contracture there is seen also a posterior subluxation of the head of the humerus, a distortion which is dependent on the contracture, and which is an index of the degree of its development. With the growth of the child these contractures become more and more noticeable, and the general underdevelopment of the whole limb and shoulder girdle is a striking feature, although the contour of the arm as regards muscular development shows the absence of any localized atrophy. The interference with the function of the limb as a whole is often considerable. The prolonged existence of the shoulder-joint subluxation is productive of secondary changes in the joint structures and shoulder girdle, one of the characteristic physical signs being a hooking down of the tip of the acromion.

Whitman[18] of New York in 1905 gave the first impetus to the recognition of this disabling sequela of birth palsy, and in this country Fairbank,[19] reporting 37 cases in 1913, 28 of which showed a subluxation, emphasized its importance and introduced the open operation for its relief. In the larger series of cases reported by Fairbank before the British Orthopaedic Association two years ago, 60 in number, the posterior subluxation of the shoulder was found to be present in 70 per cent. In a series of my own, out of 34 cases, 28 when first seen had this contracture and subluxation.

It should be realized more universally that the shoulder-joint contracture, with its accompanying subluxation, dominates the whole clinical picture of birth paralysis, and further, that this distortion is preventable by the application of early correct treatment.

On the other hand, in a minority of cases the complete absence of recovery may be seen, the paralysis persisting indefinitely, and with the development of profound muscle-wasting in the affected groups, and the production of a flail limb comparable to that seen so often in anterior poliomyelitis. This is admittedly an uncommon sequela; such limbs are exceedingly rare in adults in whom a reliable history of birth injury can be established. In my own series two examples of this type were met with in patients aged 13 and 18, and in both the anatomical localization of the nerve injury was undoubtedly radicular, and for practical purposes almost intravertebral.

Treatment.

We may discuss the treatment of Erb's paralysis and its mechanical sequelae under three headings:

1. The early postural treatment.
2. The question of the indications for the operative exploration of the plexus and the feasibility of direct repair of the nerve lesion.
3. The treatment of the contractures in cases where the paralysis has undergone recovery.

1. *Early Postural Treatment.*

Our early postural treatment is to be directed by the recognition of two facts which have already been stressed; in the majority of cases spontaneous regeneration of the injured nerve trunks will occur, and inevitably the typical internal rotation contracture will develop unless measures are taken to prevent it. It has therefore become a routine amongst those surgeons who by training and experience are competent to deal with disabling lesions of this type, to fix the injured limb at once in the position of abduction and external rotation at the shoulder, with the elbow flexed, the forearm supinated, and, if need be, the wrist dorsiflexed. This for convenience we may refer to as the "birth palsy position," and as is well known it provides the position of relaxation of the affected muscle groups and prevents the development of the contractures in the shoulder and forearm. In the newborn infant a simple T splint of block tin or aluminium is effective for this purpose. At this stage very gentle daily manipulations should be carried out particularly in the direction of external rotation at the shoulder, as in dealing with out-patients it is often difficult to ensure that the parents maintain the splint day and night in an accurate position. This posture must be maintained until the child has developed the active power of external rotation and abduction at the shoulder-joint which is generally a matter of some months. With the increasing intelligence of the child simple active muscle training by the use of toys and so on, together with light daily massage, can be added to the daily treatment.

The two essential factors in the early treatment, however, are continued splinting and daily passive stretching at the shoulder-joint. If the treatment is faithfully carried out along these lines recovery of active power in the upper limb group of muscles will be seen to be proceeding by the time the child has passed the age of 6 months, and no contractures will have developed. The birth palsy position is to be continued by means of the splint at night time only for a long period, and muscle training and passive stretching must be persevered with. One has seen the contracture develop later in a number of patients in whom splinting has been discarded too early, or where, owing to the neglect of the parents, the attendance of the child has been discontinued. It should not be necessary to-day to express the opinion that the conventional treatment so often recommended of bandaging the arm to the side is quite inefficient.

2. *The Question of Operative Exploration of the Brachial Plexus.*

It has been common surgical teaching that if after the end of three months' conservative treatment signs of recovery are lacking, and if from external electrical tests the affected muscles give the classical reaction of degeneration, the brachial plexus should be explored. Sharpe and Taylor advocate the routine exploration of the plexus in these cases at the early age of one month, and have reported independently a large series of operations, but with no end-results capable of scrutiny. This attitude does not appear to me to be sound, and from my own experience and a wide study of the literature I have no hesitation in opposing it. One must repeat that in the majority of cases the actual lesion of the nerve trunks is of such a type that spontaneous regeneration can and does occur, and that the paralysed muscle groups regain voluntary power. The disabilities of the average untreated limb following birth palsy are entirely mechanical and due to the presence of contractures and not to the continuance of actual muscle paralysis. Thus, for example, in a series of thirty-four personal cases of birth palsy recovery of the paralysis occurred in twenty-nine. This is well illustrated in the large series of cases observed in the Boston Children's Hospital by Thomas and Sever.[20]

I would urge that a reasonable procedure is to wait at least nine months in any case, and at the end of that time, if there be a complete absence of recovery and the development of muscular atrophy characteristic of a continued nerve block, that the question of exploration of the plexus be then considered. Even under these circumstances, if the clinical examination of the distribution of the paralysis reveals signs indicating the location of the lesion close to the spinal cord, exploration is not worth while, as direct nerve repair must be regarded as impossible. For this type of case it is better to wait until the child is *older*, and then to utilize the alternative methods for the restoration of function such as have proved their utility in the similar disabilities of infantile paralysis. Such alternative methods are particularly applicable also to the type of case where recovery has taken place in the upper arm muscles and a residual paralysis of the extensor group of the forearm exists. Six examples of this type occurred in my series, four of which, after prolonged relaxation by splinting, showed recovery of this muscle group, and for two of which, after failure of recovery, tendon transplantation was performed. It will thus be seen that in birth paralysis the operation of direct nerve repair will rarely be needed and may not even be feasible.

3. *The Treatment of the Contractures.*

In the infant or very young child it is usually possible to correct the posterior subluxation of the shoulder and internal rotation contracture by means of a single manipulation under anaesthesia. This can be repeated if necessary until the shortened internal rotators are completely overstretched. When stretching has been achieved by manipulation alone it is essential to maintain fixation in the correct position for a considerable period, and preferably by means of a well-fitting plaster. Correction by such simple measures has been entirely successful in eight cases of my own. In children over one year reduction by manipulation alone is often difficult, and above the age of 2 usually fails. In such cases the operation in which the contracted structures are divided must be performed. These may include, in addition to the subscapularis tendon, the pectoralis major, the coraco-humeral ligament, and coraco-brachialis tendon. In fifteen patients I have performed an open operation, using in the earlier cases the approach and technique described by Fairbank, but latterly the modification of this operation, introduced by Sever[21] of Boston, in which the joint capsule proper is left untouched.

The experience of a number of imperfect functional results after this operation has led me to adopt now a very short period of post-operative fixation, one not exceeding four to six weeks. The posture to be used after the division of the contracted structures is that of the typical birth palsy position, or, better still, with the limb

in a greater degree of abduction at the shoulder-joint. It is, of course, essential in attaining this position to prevent the scapula from following the arm, and for technical efficiency immediate post-operative fixation in plaster is to be preferred to the use of any form of splint. The after-results obviously depend on the efficiency of the physio-therapeutic treatment, and until the child has developed the full power of active over-correction return of the contracture is likely, as the effect of gravity and the normal physiological position of rest of the upper limb together constitute a natural deforming force.

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THE ANTE-NATAL TREATMENT OF CONGENITAL SYPHILIS WITH SALVARSAN AND MERCURY.

BY

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THAT the curative treatment of congenital syphilis, if not a failure, is at least a great disappointment no one who has had much experience will deny. With our improved methods, and especially when the treatment is commenced at the earliest possible moment, the death rate has been diminished and the clinical manifestations made to disappear more quickly and more completely, but a cure, in the sense of causing a positive Wassermann reaction to become negative, has only been obtained in a proportion of the cases.

Results of Curative Treatment.

This proportion of successes, too, depends very much on the age of the patient when the treatment is commenced. In our experience at the Royal Hospital for Sick Children, Glasgow, even with intensive treatment, we were unable to obtain a cure in the above sense in 10 per cent. of the children under 1 year of age, and in as great a proportion as 50 per cent. of those who first came under observation when over 1 year of age. As I have remarked, these are the results of intensive treatment, the course, in some cases, consisting of as many as even 20 to 30 injections extending over a period of several months. This is a point of some moment, as such extended courses, on account of the pain which is often caused, produce much nervousness on the part of the child, and through the apparent hopelessness of the whole proceeding, depression on the part of the physician.

Perhaps, however, the greatest disappointment has been the after-history of many of the children in whom one had thought a cure had been obtained. In some instances the children returned with condylomata, and in two instances in which the treatment was carried out at the ages of 6 weeks and 1 year respectively the children developed at the age of 7 years interstitial keratitis. In one of these latter children the Wassermann reaction had remained persistently negative, while in the other, though negative after the cessation of the course of treatment, it was found to be positive when again seen on account of keratitis.

Recently I have been examining as many as possible of the children treated some years previously and have been disheartened at the frequency with which the Wassermann reaction has, with the lapse of time, again become positive. At the present moment it is impossible for me to give complete figures regarding this point, as the investigation is still in progress, but I hope to publish the findings at an early date because I consider such information of the greatest interest and importance.

Limits of Curative Treatment.

In any case, the curative treatment has the great shortcoming that it only influences the disease in children born alive, and neglects altogether its ravages during intra-uterine life. These latter, expressed in the form of miscarriages and stillbirths, contribute in no small measure to the total loss of life from syphilis. Various have been the estimates of this loss, but it probably amounts to at least 20 to 30 per cent. of the pregnancies of syphilitic mothers.

Ante-natal Treatment.

Ante-natal treatment is, of course, no new method, but with the advent of salvarsan it has been given a new importance because, though the results still leave something to be desired, they are infinitely superior to those obtained by the most perfectly practised curative methods. Ante-natal treatment with salvarsan was first practised by Sauvage and Jeanselme, now almost ten years ago, but unfortunately it has not been adopted as generally as it deserves, being, as it undoubtedly is, not only easy of execution, but also, as already mentioned, exceedingly satisfactory in its results.

Technique.

The necessity of administering salvarsan intravenously has, on account of the difficulty of venepuncture in infants and children, considerably limited its use. In the adult, however, venepuncture is an operation of comparative simplicity, and the whole proceeding a matter of only a few minutes when concentrated solutions of the drug are employed. It is an operation, too, that can be quite safely carried out in outdoor practice. The only precaution that I have found necessary is that the patient take a laxative on the day previous to receiving the injection, as without it headache and vomiting may be troublesome. Immediately after the injection the patient may remain in the recumbent position for half an hour, after which she is able to proceed home on foot. I have never seen a pregnancy interrupted or any bad effects whatsoever; in fact, the patients usually declare that they feel unusually well.

Results of Ante-natal Treatment.

In the first place ante-natal or prophylactic treatment stands in marked contrast to the curative method, in that it at least attempts to influence the disease occurring during intrauterine life, and thus to cut short the loss of life from miscarriages and stillbirths. Galliot collected the statistics relating to 144 pregnant syphilitic women treated with salvarsan, and in only eleven, or 8 per cent., did the pregnancy not proceed to the birth of a living child. Adams in the Thavies Inn Clinic has now treated 95 syphilitic mothers, and in all has obtained the birth of a living child.

My own series of pregnant women treated only consists of fifteen, but in only one did the pregnancy not terminate with a living child, and in that instance a difficult labour was the determining factor. Equally striking with the above is the fact that not one of the children, some of whom have been kept under observation for as long a period as seven years, has presented any clinical manifestations of the disease. In all the children, too, the Wassermann reaction was negative in infancy and early childhood, but in one, who reacted negatively during infancy, a weak positive reaction was obtained at the age of 7 years, in the absence, however, of any clinical signs.

These results are very satisfactory and only show the one blemish in the weak positive Wassermann reaction in one child at 7 years of age. Perhaps I should remark in this connexion that the Wassermann tests of previous years were performed according to Wassermann's original technique, whereas those performed this year were carried out according to Harrison's method, which, of all methods, undoubtedly gives the highest proportion of positive results, and, in fact, is considered by some unduly sensitive. These results, too, are decidedly superior to those recorded earlier by Sauvage and Jeanselme, but are quite similar to those recently obtained by Adams.

But perhaps the most striking feature of this form of treatment is the way in which the mothers of previously syphilitic children continue to bear healthy non-syphilitic children in spite of no further treatment being instituted. This is well exemplified in the following series of families, the mothers of whom were treated in 1914, and have been kept under observation since.

Case I.

Mrs. M. Five previous pregnancies. No miscarriages. Fifth child definitely syphilitic. Wassermann reaction slightly positive in mother and child.

February 21st, 1914. Seven months pregnant.

February 22nd till March 22nd. Four injections of neo-salvarsan intravenously *plus* mercurial inunction. No treatment since.

April 7th. Wassermann reaction positive but weak.

April 25th: Sixth child born (female). June 22nd: Child 8 weeks, well; Wassermann reaction negative. March 8th, 1915: Child 11 months, well; Wassermann reaction negative. December 3rd, 1919: Child 4½ years, well; Wassermann reaction negative. June 3rd, 1921: Child 7 years, well; Wassermann reaction negative.

September 1st, 1916: Seventh child born (male). January 10th, 1917: Child 4 months, well; Wassermann reaction negative. September, 1918: Child 1 year, well; Wassermann reaction negative. February, 1921: Child 4½ years, well; Wassermann reaction negative.

February 2nd, 1921. Wassermann reaction negative.

Case II.

Mrs. W. Three previous pregnancies. First stillborn; second, apparently healthy child of 4½ years; third, case of congenital heart disease with saddle nose. Wassermann reaction positive in mother and second and third children.

February 11th, 1914. Five and a half months pregnant.

February 11th to April 19th. Four injections of neo-salvarsan intravenously and mercurial inunction. No subsequent treatment.

May 19th. Wassermann reaction negative.

May 24th: Fourth child born (male). February 21st, 1915: Child 9 months, healthy; Wassermann reaction negative. June 11th, 1921: Child 7 years, well; Wassermann reaction negative.

September 11th, 1920: Fifth child born (female). November 11th: Child well; Wassermann reaction negative. Seen at 10 months, well.

June 6th, 1921. Wassermann reaction negative.

Case III.

Mrs. K. Three previous pregnancies. First child had rash on body and died at 2 months; second was an 8 months child and only lived one month; third was a typically syphilitic child, which died at 8 weeks. Wassermann reaction positive in mother.

April 22nd, 1914. Two months pregnant.

April 23rd to July 1st. Five injections of neo-salvarsan intravenously *plus* mercurial inunction. No treatment since.

November 2nd: Fourth child born (male). March 8th, 1915: Child 4 months, healthy; Wassermann reaction negative. June 7th, 1921: Child 7 years, well; Wassermann reaction negative.

January 7th, 1917: Fifth child born (female). June 7th, 1921: Child 4½ years, well; Wassermann reaction negative.

April 9th, 1919: Sixth child born (male). June 7th, 1921: Child 2½ years, well; Wassermann reaction negative.

June 7th, 1921. Wassermann reaction positive.

Case IV.

Mrs. S. Seven previous pregnancies. Last child was typically syphilitic and gave a positive Wassermann reaction.

April 22nd, 1914. Two months pregnant.

April 22nd to July 1st. Five injections of neo-salvarsan *plus* mercurial inunction. No subsequent treatment.

June 8th. Wassermann reaction negative.

December 10th: Eighth child born (male). March 10th, 1915: Child 3 months, well; Wassermann reaction negative. June 21st, 1921: Child 7 years, well; Wassermann reaction positive.

March 10th, 1915. Wassermann reaction negative.

January 5th, 1917: Ninth child born (female). June 21st, 1921: Always well. Wassermann reaction doubtful.

May 15th, 1919: Tenth child born (male). June 21st, 1921: Always well. Wassermann reaction negative.

December 6th, 1920: Eleventh child born (female). June 21st, 1921: Always well. Wassermann reaction negative.

June 21st, 1921. Wassermann reaction negative.

Case V.

Mrs. M'N. Four previous pregnancies. First died at 10 months from "bronchial asthma"; second died at 8 months; third alive. Wassermann reaction positive. Fourth seen by me with severe congenital syphilis.

September 30th, 1914. Seven months pregnant. Wassermann reaction positive.

September 30th to October 21st, 1914. Four injections of neo-salvarsan intravenously and mercurial inunctions. No treatment since.

December 10th. Fifth child born (male). March 12th, 1915. Child 3 months, well; Wassermann reaction negative. Died of bronchopneumonia.

January 24th, 1916. Sixth child born (female). Seen at 4 months, well; Wassermann reaction negative. Died at 6 months of bronchopneumonia.

January 12th, 1917. Wassermann reaction positive.

June 12th. Seventh child born (male). December 12th. Aged 6 months, well; Wassermann reaction negative. January 8th, 1918. Aged 9 months, well; Wassermann reaction negative. June 30th, 1921. Aged 4 years, well; Wassermann reaction negative.

January 8th, 1918. Wassermann reaction negative.

July 29th, 1919. Eighth child born (female). Died when 7 weeks old of bronchopneumonia; no evidence of syphilis.

October 2nd, 1920. Ninth child born (male). Died when 2 months old of bronchopneumonia; no evidence of syphilis.

June 30th, 1921. Wassermann reaction negative.

It would seem from a survey of the above histories that even though these women continue to bear non-syphilitic children, their own serums may persist in reacting positively to Wassermann's test. One knows, of course, that the child of a woman whose blood reacts positively is not necessarily syphilitic. In fact the erratic appearance of healthy and syphilitic children in a family is one of the most striking features of congenital syphilis. In the above series of families, however, there are no syphilitic children borne, which is probably due to the fact that, although all spirochaetes have not been destroyed, those situated in the uterine tissues, which we consider the *fons et origo* of the disease in the foetus, have been destroyed. Other foci of spirochaetes, however, may, on account of the avascularity of the harbouring tissues, have escaped the effect of the spirochaeticide, and though continuing to bring about the serological changes be harmless so far as the product of conception is concerned.

Time of Election for Treatment.

When should the treatment be carried out? Is there a time of election? Should the treatment be carried out as soon as the diagnosis is made or should it be delayed till the woman is pregnant? In other words, "Are equally good results obtained irrespective of when the treatment is instituted?"

Personally I have usually selected the period of pregnancy partly because on theoretical grounds it seemed to me that the increased vascularity of the tissues—the endometrium—which we consider the locus of the invading spirochaete, during that event will facilitate the influx of the spirochaeticide. I also thought that the near approach of another possible syphilitic child would be an inducement for the mother to subject herself to the treatment. Certainly, I do not think that better results could be obtained by carrying out the treatment at any other time, but if equally good results could be obtained, then a greater latitude would be allowed the physician, and in this way help towards its more general adoption. Though I have also treated women when not pregnant, I have not personally sufficient data on which to found an opinion, but I have no doubt that to-day some information on this important point will be forthcoming.

Notification of Syphilis.

As I have previously mentioned, this method of treatment has not been practised as generally as it deserves. It undoubtedly is the treatment *par excellence*, an opinion homologated by all who took part in the discussion on the diagnosis and treatment of congenital syphilis at the Royal Society of Medicine in February of this year. It is consequently our duty to promote anything that will encourage its general application.

In so many syphilitic mothers the sole evidence of the disease—with the exception, of course, of a possibly positive Wassermann reaction—is the syphilitic progeny that it seems to me the only feasible plan of recognizing those requiring treatment is to notify all miscarriages and stillbirths and syphilitic children. Those examples of miscarriage and stillbirth due to syphilis can be decided by subjecting the mother's blood to the Wassermann test and the necessary treatment instituted. In this way we could reduce the loss of infant life from syphilis to a minimum.

I know that there have been many objections raised against the notification of this disease, but I consider we have satisfactory answers to all of them. We are already notifying one form of congenital venereal disease—ophthalmia neonatorum—so that the further step recommended should be comparatively easily made. Were our reasons for notification merely the collecting of statistics, then its adoption, I admit, would be most difficult to support, but our reason is the more general adoption of the most advanced and most satisfactory method of treatment, the like results of which we medical men cannot promise with such confidence in any other morbid condition that we are called upon to treat.

At the meeting of the Venereal Diseases Section of the British Medical Association last year this same question of notification was raised, and the President (Mr. Turner) sounded a word of warning, as he called it, that the public were not ready for such a measure. When, might I ask, did it become the proper attitude of the physician to delay treatment till his patient considered it right and proper? In conclusion, I ask, have we made up our minds about the value of notification? If we have, then it is our bounden duty to act with all the power that within us lies.

DISCUSSION.

Dr. H. Brooker Mills (Philadelphia) said that he heartily approved of the prenatal treatment of syphilis, either before the pregnancy occurred if the disease was known to be present, or during the pregnancy if syphilis was only discovered after conception had taken place. He had seen nothing but good result. He asked if Dr. Findlay advised breast nursing in these cases, and, if so, if he would withhold the treatment of the mother during this time. In view of the difficulty of intravenous medication of infants, he was in the habit of administering 6/10 of a decigram of salvarsan in 100 c.cm. of normal salt solution by the Murphy drip with good results. Dr. Findlay, in reply, said that he always advised breast feeding.

Dr. Harold Scurfield (late M.O.H. Sheffield) asked if Dr. Findlay treated all his cases as out-patients and if he thought the authorities responsible for establishing venereal disease centres were sufficiently aware of the comparative failure of the treatment of congenital syphilis and of the vastly superior results obtained by treating the mother before the birth of the child. Dr. Findlay emphasized that all his cases were treated as out-patients.

Resolution.

On the motion of Dr. Findlay (Glasgow), seconded by Dr. Scurfield, the following resolution was passed, several members of the meeting dissenting:

> This meeting of the Diseases of Children Section of the British Medical Association, feeling strongly the failure of the curative treatment of congenital syphilis, and appreciating the very superior results obtained by the pre-natal or prophylactic method, recommend, in order to encourage the latter method, that the notification of all cases of congenital syphilis, miscarriage, and stillbirth is desirable. Those miscarriages and stillbirths due to syphilis could be detected by Wassermann's test of the mother's serum, and the necessary treatment of the mother carried out. This meeting desires the Council of the British Medical Association to bring this question to the notice of the Ministry of Health.

THE CAUSATION OF THE SYMPTOMS IN CONGENITAL HYPERTROPHY OF THE PYLORUS.

BY

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The essential cause of congenital hypertrophy of the pylorus is entirely obscure. No circumstances are known as yet regarding the heredity, intrauterine life, birth, or surroundings of the children which can be blamed for its occurrence.

As to the way in which this unknown cause produces the muscular overgrowth, which is the primary structural characteristic of the disease, two hypotheses have been suggested: (1) Professor Hirschsprung (to whom belongs the credit of having been the first to draw the attention of the profession, in 1888, to the clinical importance of the condition) regarded it as a primary developmental hyperplasia, and all that can be said in favour of this view has been ably stated by later writers—especially by Dr. Cautley and the late Mr. Clinton Dent. (2) The other theory, which seems to me far more likely, regards the muscular hypertrophy as secondary to some form of antecedent overaction, and suggests that this may have resulted from long-continued inharmonious working of the various elements of the muscular mechanism which controls the emptying of the stomach. Such incoordination would probably have begun before birth, but would be most active and effective during the first weeks

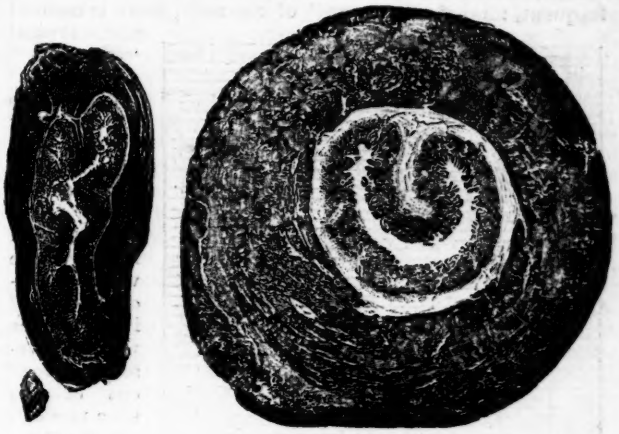

Fig. 1. Fig. 2.

Fig. 1.—Transverse section of normal pylorus near the duodenum, × 4 diam.; child of nine weeks.

Fig. 2.—Transverse section of hypertrophied pylorus near the duodenum, × 4 diam.; child of nine weeks.

(*Photographs by Mr. Richard Muir.*)

of life. To deranged muscular action of this sort we may attribute, not only the hypertrophy of the muscle, but also much of the retention of food in the stomach. As the case progresses, however, other very important mechanical causes of obstruction arise, which greatly aggravate the symptoms. These secondary causes of blocking consist in the increasing thickening of the muscular coat of the pylorus and in longitudinal folding of its mucous membrane (Figs. 1 and 2).

There are good reasons, derived from pathology, clinical observation, and the results of surgical operation, for believing that the size of the pylorus increases very greatly during the early weeks of life. While the muscular tissue is becoming rapidly thicker, it is confined within the peritoneal coat. This tube is not capable of stretching with sufficient rapidity to make room for its enlarging contents. The muscular overgrowth, therefore, presses increasingly inwards and narrows the lumen. At the same time, its compression usually throws the mucous membrane into one or more large "polypoid" folds, which further contract the passage until, in the worst cases, it becomes almost entirely occluded. These folds have been described by many writers on the subject, and have even sometimes been regarded as the primary source of the symptoms.[1] It is interesting to note that apparently similar folds have often been found in the posterior urethra in cases of congenital hypertrophy of the bladder with hydronephrosis[2]—a condition which is probably to be considered as closely analogous to congenital pyloric hypertrophy.

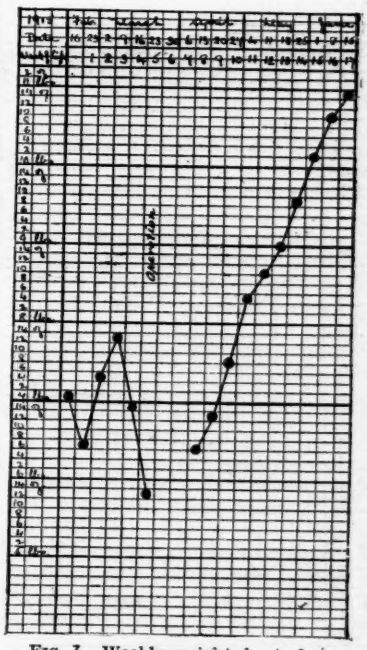

Fig. 3.—Weekly weight chart of case successfully treated by operation (Loreta).

The main clinical features of the disease may be divided into four stages:

1. There is first a stage without any symptoms, which

lasts from one to eight weeks (usually two to four) after birth. During this period the child seems quite normal and gains weight at the usual rate. The pylorus cannot be felt, and there is no characteristic visible gastric peristalsis; and, although there may be occasional, or even frequent, mild "putting up" of the milk, there is none of the typical "shooting" vomiting.

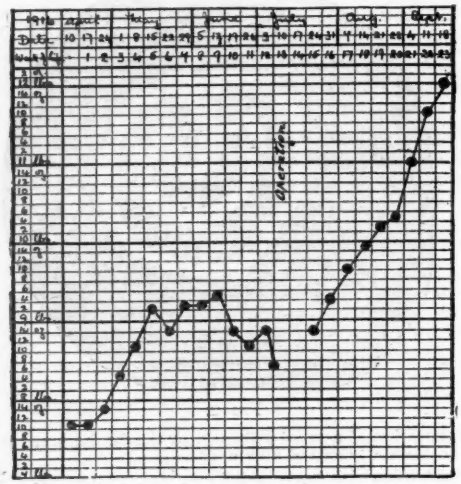

Fig. 4.—Weekly weight chart of case successfully treated by operation (Rammstedt).

2. A stage of primary symptoms of pyloric obstruction of varying duration. In it there are various indications of interference with the passage of food out of the stomach, and, later, of great enlargement of the pylorus. These indications are: (*a*) Characteristic violent vomiting, beginning usually between the second and fourth week; (*b*) prolonged retention in the stomach of any food that is not vomited (as demonstrated by the use of the stomach tube); (*c*) drying up of all the tissues, with arrest in the normal gain in weight, scanty urine and small infrequent motions; these symptoms are due mainly to the small amount of fluid which is reaching the bowel; (*d*) exaggerated visible gastric peristalsis, which usually begins during the fourth or fifth week and may be much later in appearing, but it never occurs during the first two and a half weeks; its presence is evidence of pyloric obstruction and also of muscular hypertrophy, with commencing dilatation of the stomach wall; (*e*) enlargement of the pylorus can be felt in the majority of cases, but usually not before the third or fourth week of life, and often only later; the youngest child in whom I have found it was 18 days old.

3. A stage of secondary symptoms. This varies in date of onset and in duration, according to the severity of the case and the nature of the treatment employed. We find (*a*) emaciation and debility; (*b*) great dilatation of the stomach; (*c*) much mucus in the gastric contents and in the faeces; (*d*) ordinary symptoms of dyspepsia and toxaemia, such as flatulence, colic, diarrhoea, drowsiness, and sometimes convulsions. These symptoms are mainly due to catarrh of the stomach and bowel, resulting from abnormal retention, with fermentation of the stomach contents, and often also from the unsuitable character of the feeding.

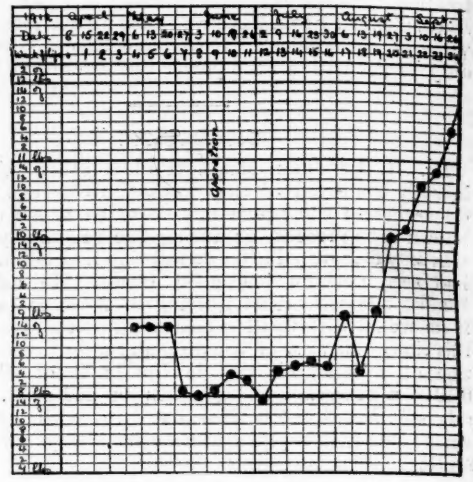

Fig. 5.—Weekly weight chart of case treated by operation (Loreta) with only partial success; curve therefore resembles that of a medically treated case.

4. Lastly, if the child survives the earlier stages, there is a period of recovery. During this stage the muscular inco-ordination of the organ becomes normal, the peritoneal coat gradually widens, the muscular hypertrophy probably subsides, though certainly very slowly, and the lumen enlarges.

The disease is therefore, in an important sense, self-limited; for, if the child does not die of inanition from too little food reaching the bowel, or from some complication, the natural processes of growth and development will always, in time, remove the obstruction altogether. Weekly weight charts (Figs. 3 to 7) illustrate the extreme slowness—lasting for months—with which the opening up of the pylorus proceeds in medically treated cases, and the rapid gain which follows a successful operation.

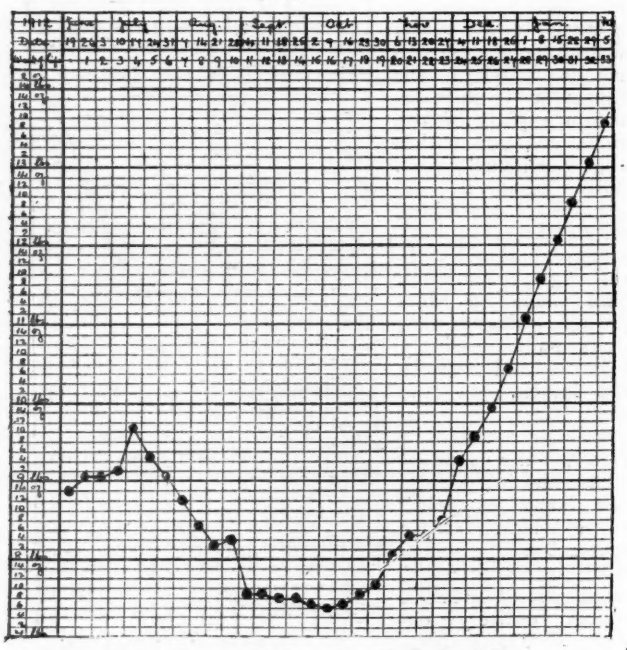

Fig. 6.—Weekly weight chart of medically treated case.

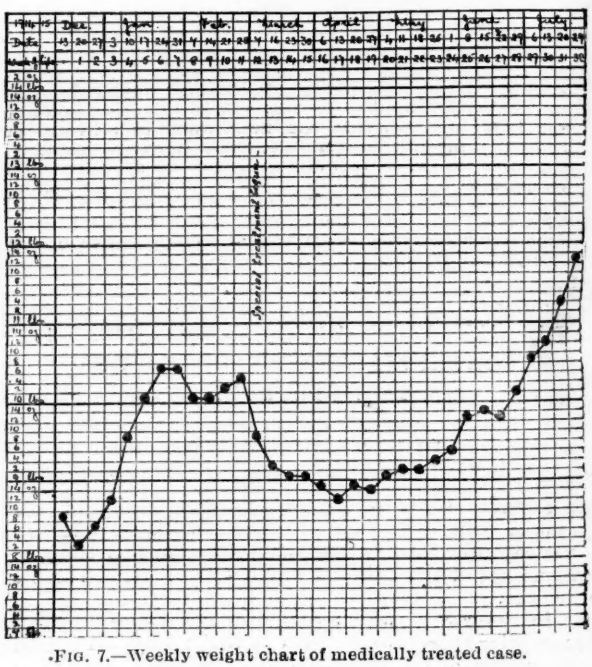

Fig. 7.—Weekly weight chart of medically treated case.

Some of the clinical features of pyloric stenosis which were formerly very perplexing seem to be capable of explanation by the combined functional and mechanical causation of the pyloric closure. For example, the usual complete absence of symptoms during the first week, or weeks, of the child's life, and the absence of palpable enlargement of the pylorus, are almost certainly due to the slight degree of the muscular hypertrophy present at this

stage. Owing to this, the passage is still relatively wide, and its functional closure by irregular muscular action is not, in most cases, sufficiently constant to have serious consequences. Later, as the thickening of the muscular coat and the folding of the mucous membrane increase, the opening becomes so narrow that it is not large enough for its purpose, even where the muscle is in a state of relaxation.

In some cases the symptoms set in unusually early and severely, and the obstruction is dangerously complete before the end of the third week; while, in others, in which the diagnosis is equally certain, the onset is delayed, and the vomiting and other symptoms are much less urgent than usual. It seems probable that the very acute cases are those in which the pyloric tube is small, or the muscular overgrowth and the folding of the mucous membrane especially rapid in their formation; while those cases with mild and late symptoms may owe their less severe character to the obstruction in them depending relatively more on muscular contraction and less on mechanical blocking.

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CONGENITAL HYPERTROPHIC PYLORIC STENOSIS:

AN ANALYSIS OF 50 OPERATIONS.

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THE surgical aspect of this subject is to be considered under two headings—namely, (1) operative technique, and (2) general surgical considerations.

Operative Technique.

The problems of this disease are many; all operations, however, are directed to one object only, the relief of pyloric obstruction. In a previous communication [1] by one of us, reasons, both practical and theoretical, were given for considering Rammstedt's operation to be the method of choice. We still adhere to that view, and are confident it will supersede all other methods hitherto practised.

Rammstedt's operation is so rapid, easy and simple that it is safe in all hands; but six cardinal rules are essential to success: (*a*) Gentleness (or, as Moynihan terms it, "daintiness") in all intra-abdominal manipulations. This is nowhere of greater importance than in dealing with small infants. (*b*) Speed; this is important, but it is quite distinct from "hurry," which usually means roughness. (*c*) Minimum of manipulation; the exposure and delivery of the pylorus should be so planned that only liver and stomach are seen. Prolapse of intestine, and particularly omentum, increase the risks. (*d*) The pyloric incision should be placed as near the convex upper surface as can be conveniently reached—that is to say, the most avascular area. The mucosa must be exposed throughout its length until it bulges into the wound. (*e*) Length of pyloric incision; [2] the tumour should be divided throughout its whole length on the proximal side; but the incision should stop just short of its termination on the distal or duodenal side. (*f*) Haemostasis; bleeding points from the cut edge are controlled by very fine mattress sutures of catgut. This may be required at the two extremes of the incision, particularly on the proximal side. Experience has shown that the observance of these rules is of the greatest importance.

General Surgical Considerations.

Now since it is probably true that the study of failures is more instructive than the recitation of successes the object of this paper is to examine the causes of failure and to learn thereby the means by which the mortality can be (indeed has been) greatly reduced.

We have studied our series of fifty cases operated upon. Of these, eight were operated on by other methods and are excluded, while two died from a prevalent epidemic after operation, and two, early in our experience, from accidental causes. This leaves for this study thirty-eight cases operated on with a mortality from all causes of 55 per cent. There are three varieties of death after operation, one of which is also a common feature of cases treated medically without operation. These are: (*a*) Sudden immediate collapse (within a few hours of operation) occurred in 21 per cent. of the total, or 38 per cent. of fatal cases. (*b*) Sudden delayed collapse (within three to six days of operation) occurred in 18 per cent. of the total, or 33 per cent. of fatal cases; this is also observed in cases medically treated. Deaths in both these categories (*a* and *b*) occur quite suddenly in infants who appear to be in excellent condition. (*c*) "Diarrhoea" was responsible for death in 15 per cent. of total cases, or 28 per cent. of fatal results. (We include here both steatorrhoea and infective enteritis.) It is under these three divisions that the fatalities are to be studied. Now, since the etiology and pathology of this disease are intimately associated with the causes of death, it is important to estimate these factors as far as possible.

Hypertrophy.

Briefly, then, the pyloric hypertrophy is a real one, the muscle showing both hypertrophy and hyperplasia (photographs shown). There is only one cause of localized hypertrophy of a muscle, and that is over-use. Clinical evidence appears to us to support the view that closure of the pyloric sphincter is controlled by stimulation of the sympathetic nerve supply and by its hormone (adrenaline)[3]; and the logical inference is that the pyloric hypertrophy is associated with hyperadrenalism, the result of excessive sympathetic stimulation. (The hypothesis advanced by Dr. Pirie and one of us.) We are unable on present evidence to agree with Haas that pyloric closure is controlled by the vagus; the improvement and cures in his cases, following the vigorous use of atropine, are probably attributable to consequent diminution of secretion and shrinkage of the mucosa rather than to any effect on the pyloric sphincter.

Now there is no evidence of hyperadrenalism in the child; but, since it is generally conceded that the hypertrophy takes place *in utero*, it is probable that the hyperadrenalism is maternal in origin. There is some evidence of this in our series. Thus there is a natural anxiety and apprehension, etc., in every pregnant mother; and this is accentuated under certain circumstances—for instance, (*a*) first children, (*b*) children born after a long interval, (*c*) children born while the husband's existence is in jeopardy (for instance, during the late war), (*d*) children born when all other children died in infancy, and (*e*) the individual factor, which could only be estimated in a few, and is excluded.

Of the 37 cases available, 60 per cent. were first children. In addition, we have considered as equivalent to a first child, in effect on the mother's psychology, cases coming under categories (*b*), (*c*), and (*d*), and we find that 21 per cent. of cases are equivalent to first children in this respect. The first child factor, therefore, is present in 81 per cent. of our cases, and, if the individual variation of females in sympathetic responsiveness is borne in mind, the percentage is probably higher.

We submit that these figures afford definite evidence in favour of hyperadrenalism as an etiological factor in pyloric hypertrophy. Further support is to be found in the study of adults, where the effect (both direct and indirect) of psychic conditions on the adrenals and gastro-intestinal tract is an everyday clinical experience.

Pancreatic Insufficiency.

But, adrenaline being antagonistic to pancreatic function, it would be expected that pancreatic insufficiency (one manifestation of which is a failure to digest fats) would be a feature when obstruction is relieved. Diarrhoea occurring late after operation is one of the most disappointing terminations of successful operation; 15 per cent. of all cases died from this cause. Diarrhoea is further responsible for 28 per cent. of fatal cases; while, of the 44 per cent. who developed this complication, 35 per cent. died.

The diarrhoea is of two types: (*a*) Steatorrhoea. The mortality of cases developing steatorrhoea was 33 per cent.

(*b*) Infective (enteritis). Where this complication supervened, over 80 per cent. died. The inference is that concomitant pancreatic insufficiency exists with pyloric hypertrophy; that it enhances still further the pyloric closure; and that, pancreatic secretion being the main chemical stimulus of succus entericus, food, when obstruction is relieved, passes through undigested. Such a condition means the presence of an "irritant" in the small intestine, and invites acute infection in the presence of organisms. That the mortality is 80 per cent., therefore, is to be expected, and that this dreaded complication is not primarily infective alone is suggested by the fact that its onset is uninfluenced whether gastric lavage has been practised or not.

Steatorrhoea, therefore, predisposes to infective enteritis. This feature is not noticeable in our experience after the relief of pyloric obstruction in the adult; and it constitutes a link in the chain of evidence against the view that all the sequelae are entirely secondary to pyloric obstruction. We feel the balance of evidence to be in favour of the view that both pyloric hypertrophy and pancreatic insufficiency are separate, but interacting, manifestations of original hyperadrenalism—a view further supported by the fact that the size of the pylorus bears no relationship to the severity of the symptoms or the course of the disease. Thus the surgical breach of the vicious circle, by pyloric section, cures the obstruction immediately, but leaves untouched the pancreatic defect, which takes roughly as long to be re-established to the normal as the duration of the original symptoms.[4] This has an important bearing on post-operative feeding.

Biliary Insufficiency.

Biliary insufficiency is a necessary accompaniment of pancreatic insufficiency, since both are mainly dependent on secretin for their stimulation, and therefore both are affected by the degree of pyloric obstruction. The onset of hepatic failure, under such conditions, would appear to be dependent only on the presence of an exciting factor. We have been unable to get direct evidence of this factor as a cause of death, but the question arises whether death from delayed collapse is not due to fatty degeneration of the liver.

In this connexion Mr. Twistington Higgins informs us that he has found this in sections of the liver when death of this type occurred; while Dr. Donald Paterson has observed it in fatal cases where no operation has been performed. Further, though the relationship of the anaesthetic employed to the mortality will be referred to later, in support of this suggestion is the fact that in our series 86 per cent. of deaths from delayed collapse occurred when chloroform and ether were administered. No case has been lost from this cause when gas and oxygen has been employed.

There are two other accessory factors accentuating pyloric closure, and therefore tightening the vicious circle under discussion:

Gastritis arising from retained contents, by causing hyperaemia and swelling of the mucosa, accentuates the obstruction, and therefore also increases the pancreatic and biliary insufficiency. Now gastritis is easily eliminated by lavage, and we should expect to find that systematic pre-operative lavage, by allowing some acid to pass into the duodenum, would render less complete the pancreatic and biliary insufficiency and improve the prognosis. On the other hand, a higher mortality would be expected when lavage had been omitted. Thus, when lavage was practised previous to operation, 56 per cent. recovered, and when lavage was omitted only 29 per cent. recovered. Of the total recoveries, 87 per cent. were treated by lavage, while of total fatalities 68 per cent. were so treated. In only two cases was gastritis severe enough to cause haematemesis, and both died. We conclude that the degree of retention gastritis has an important bearing on the prognosis, and that the elimination of this unfavourable factor by lavage is an essential preliminary to operation.

Phimosis, adherent prepuce, retained smegma, and balanitis may all provide a focus of constant irritation. The marked influence of sympathetic stimulation on the gastro-intestinal tract is generally acknowledged, while the sex stimulus is naturally one of the most powerful in the animal kingdom, and its response is also sympathetic in character. Further, the sympathetic stimulus arising from manipulation or trauma of the prepuce under anaesthesia is evidenced by laryngeal stridor and a striking excursion of the blood pressure. (The same feature is observed in other parts of the genital organs in both sexes.) It is not surprising that a similar effect on the gastro-intestinal tract should be observable in the milder continued stimuli of irritative lesions. The association of phimosis, etc., with vomiting (pyloric spasm) and constipation of different degrees in otherwise normal infants may be proved by any investigator, while it is only to be expected that in a narrow hypertrophic pylorus the effect is still more evident. But, for reasons which will be apparent, we do not now advocate circumcision as an alternative or a routine preliminary to Rammstedt's operation, but it should certainly be performed after recovery when necessary.

That these are added factors in pyloric closure is further suggested by an analysis of cases. Thus, there were 68 per cent. of males and 31 per cent. of females in the series, or rather over 2 to 1. Further, in the presence of such an added factor, it would be reasonable to expect that obstruction would be more complete, and therefore the onset of symptoms would be more acute, the course more severe, and the prognosis worse. Of the males, the onset was acute or fulminating in 55 per cent., gradual in 44 per cent. Of the females, only 22 per cent. showed an acute onset, and in 77 per cent. it was gradual.

If we take post-operative diarrhoea as some indication of the degree of pancreatic and biliary insufficiency, we find again that males run a severer course. Thus diarrhoea before operation is definitely more frequent in females (for constipation was a feature of 88 per cent. males compared with 75 per cent. females), indicating a less complete obstruction in females. But death from post-operative diarrhoea occurred in 83 per cent. males and only 16 per cent. females—convincing figures compared with the sex proportion. The prognosis is proportionately unfavourable, for of the total deaths 28 per cent. were females and 71 per cent. were males; while of the female cases 50 per cent. and of the males 57 per cent. were fatal. Of death from immediate collapse, 37 per cent. were females (14 per cent. of total mortality); 63 per cent. of such deaths were males (23 per cent. of total mortality). Of deaths from delayed collapse, 28 per cent. were females (9 per cent. of total mortality), while 72 per cent. were males.

If there is any truth in the suggestion that this kind of death is due to fatty degeneration of the liver it should be specially noted that the percentage of males is definitely higher in this than in the previous category. It may further be noted that of deaths from post-operative diarrhoea "16 per cent. of females" represents 4 per cent. of total mortality, and "83 per cent. of males" represents 23 per cent. of the total mortality, and this is a most striking feature.

If, further, the extraordinary infrequency of symptoms in cases where circumcision is performed *early* be borne in mind it cannot surely be contended that the steady sex preponderance, and the striking figures produced, are without significance. We lay great stress on the question of sex and the first child factor in the etiology and severity of the condition, and submit that the figures afford justification. The latter will again be referred to in connexion with mortality from operation.

The prognosis is influenced to some extent by the following additional uncontrollable factors.

Uncontrollable Factors.

Age.—The average age at the time of operation in our series was 8 weeks. The mortality in cases of 8 weeks and under was 66 per cent.; over 8 weeks the mortality was only 34 per cent., so that the proportion is roughly 2 to 1 (vide weight). The average age was considerably increased by a few mild cases in older children, one of which was operated on in the twenty-first week. In a large majority the age was under 6 weeks, several infants being 2 weeks, and in two instances 1 week of age. It is interesting to note that the increased risk in the younger subjects occurs particularly in relation to immediate collapse and the late onset of diarrhoea. Thus, of the deaths from immediate collapse, 75 per cent. were 8 weeks or under, in contrast to the equal proportion of deaths to recoveries in delayed collapse. The age does not seem to influence the onset of post-operative diarrhoea; but, when

diarrhoea has supervened, the younger the subject the less likely is the recovery, for deaths from diarrhoea occurred in only 16 per cent. over the average age and in 83 per cent. under the average age.

Weight.—This is most important, for the average weight was 6.5 lb.; and under this weight 69 per cent. died, while of those over the average only 37 per cent. died. A decline in weight clearly constitutes an urgent indication for surgery, especially when near the border-line—that is to say, 6 lb. Of the total deaths, 75 per cent. were under the average (represented by a proportion of 3 to 1); and, if this be compared with the age at operation, it will be evident that the weight is of greater prognostic significance.

First Children and First Child Equivalent.—Of these, 55 per cent. died and 45 per cent. recovered; and, of the total mortality, 71 per cent. were first children or the equivalent. The reason for this increased mortality is probably the more marked hyperadrenalism in the mother, leading to the increased severity of the disease in the child. It is equally significant that of the first children 63 per cent. were males.

Onset of Symptoms.—The age at onset is of value in relation to the first child factor; for whereas the average age of onset was 3.4 weeks, the average age in first children was 2.9 weeks. Further, at two weeks the proportion of first to other children was equal; in the third week the figures were 6 to 9; in the fourth week 2 to 4; and in the fifth week 4 to 7. This means that there is a tendency to an increased delay in the development of symptoms (or, in other words, decreased severity) in second, third, and subsequent children. This constitutes an additional scrap of evidence in favour of hyperadrenalism as an etiological factor. In harmony with this we find that of all cases 31 per cent. of those above the average age at onset developed post-operative diarrhoea, while in those below the figure was 67 per cent. The influence on prognosis is evident.

Pre-operative pyrexia is frequent and often difficult to explain; in our series 42 per cent. of cases showed a temperature varying from 100° to 105° F. (Two cases reached 105° F. and both recovered.) Contrary to our expectation, we are unable to find any evidence that such sporadic pyrexia has any definite bearing on the prognosis in itself; it certainly constitutes no plea for avoiding surgical interference. Further, subcutaneous infusion does not raise the temperature to an appreciable extent, rarely more than 1½° (or 100° F.).

Controllable Factors.

Anaesthesia.—This concerns death from immediate and delayed collapse only; the late onset of diarrhoea is apparently uninfluenced by this factor. Chloroform and ether, and ether alone, are both unsatisfactory anaesthetics; for, whereas the former showed a mortality of 43 per cent., the figure for the latter alone is 71 per cent. Local and spinal anaesthetics both expose these infants to dangerous complications. One fact is evident—namely, that the powerful drugs of this type are badly borne. The possible bearing on fatty degeneration of the liver should be noted.

The best results are being obtained with gas and oxygen; for though the mortality is 37 per cent., the operation mortality (immediate and delayed collapse) is nil. *These fatalities were all due to diarrhoea occurring some weeks after recovery from delayed operation.* Thus: Immediate collapse occurred in 14 per cent. with chloroform and ether, in 42 per cent. with ether, and in 0 per cent. with gas and oxygen; delayed collapse occurred in 28 per cent. with chloroform and ether, in 14 per cent. with ether, and in 0 per cent. with gas and oxygen. With gas and oxygen the total mortality (all from late diarrhoea and marasmus) at Great Ormond Street up to the present time is 30 per cent. (the operation mortality being apparently eliminated); and this figure is only a little above the 28 per cent. deaths from diarrhoea.

Post-operative Pyrexia.—One of the features of Rammstedt's operation has been the extraordinarily high temperature compatible with recovery (for example, 106°). The average temperature was 103° F. It was thought at one time that preliminary subcutaneous infusion with normal saline and glucose (2 per cent.) might be partly or wholly responsible, but in a series of cases this was omitted, and little difference was observed. This opinion coincides with the analysis of our cases; for of those whose temperature rose above the average, 84 per cent. were infused; while, of the remainder, 75 per cent. were infused. Further, it has been suggested that the high temperatures observed might have been due to infection from within, since, after pyloric section, only the mucosa intervenes, and lymphatics are necessarily damaged. Apart from the fact that we have never observed peritonitis in the absence of accidental puncture of the mucosa, if sepsis were a factor it would be expected that systematic lavage would diminish such a risk. But in our series lavage, or its omission, has not influenced the temperature, and we conclude that no septic element is responsible.

If the temperatnre be investigated in relation to the anaesthetic employed the figures are conclusive. For, when chloroform and ether were employed, the temperature rose above the average in 60 per cent., and when gas and oxygen were employed the average was exceeded in only 16 per cent. Hyperpyrexia, therefore, is probably due almost entirely to the anaesthetic, and it is not a feature with gas and oxygen; but we find no evidence that hyperpyrexia causes immediate or delayed collapse, or, indeed, that it appreciably influences the mortality.

Preparation for operation consists in systematic gastric lavage and subcutaneous infusion of 2 per cent. glucose in normal saline, until the elasticity of the skin has returned or for at least two days. Both are important. We have operated with such preparation, and also without (as emergencies). When lavage was practised (78 per cent. of cases) there were 56 per cent. recoveries; when omitted (22 per cent.) the recoveries fell to 29 per cent. When infusion was adopted as a preliminary to operation the mortality was 43 per cent.; when it was omitted, 63 per cent. died. In the fatalities from immediate post-operative collapse, 57 per cent. were not prepared by infusion. Where the patients were below the average age (8 weeks) the figures are still more convincing—for of those infused, only 17 per cent. died; while those who were not so prepared show a mortality of 83 per cent. These figures appear to us conclusive that preparation for operation by lavage and infusion is one of the essentials, and that operation should never be undertaken as an emergency. Further, the younger the subject the more urgent is the need for such preparatory treatment.

Duration of Symptoms and Prolonged Medical Treatment.

In regard to the duration of symptoms previous to operation, the condition of the patient varies directly with the duration of the symptoms; for where the condition was noted as good the average duration was 4.3 weeks, and where the condition was bad the average was 6.2 weeks. Further, the average duration in fatal cases was six and a half weeks; while in those who recovered it was four and a half weeks.

Prolonged medical treatment is responsible (together with ether anaesthesia) for a large proportion of fatal cases. When such treatment was continued over four days the mortality was 70 per cent., but surgical interference within four days reduced the mortality to 43 per cent.

We have not been able to demonstrate that the diet before operation influenced the result; but post-operative feeding is most important. Until pancreatic functions are fully restored (the interval corresponds approximately to the duration of the symptoms) fats are passed undigested. Briefly, the best results may be expected by starting feeding on glucose water for twenty-four hours, and gradually working up to peptonized milk from which most of the fats have been removed, until the pancreatic functions have been coaxed back to the normal, and the full complement can be dealt with. Then, no doubt, breast milk is the best, but it is rarely obtainable, owing to the prevalent but deplorable habit of weaning infants directly they vomit.

Conclusions.

The following are the most important:

1. Accumulating evidence supports Pirie's hypothesis, that hyperadrenalism causes pyloric hypertrophy, which is to be regarded as one of its manifestations.
2. Pancreatic and biliary insufficiency, also resulting from hyperadrenalism, accentuate the pyloric closure and influence the mortality.
3. The sex preponderance is of similar importance.
4. Gas and oxygen anaesthesia will nearly eliminate operative fatalities, both immediate and delayed.

5. Operation should never be undertaken as an emergency.
6. Systematic preparation for operation by lavage and infusion is essential. Even moribund cases can be so rendered operable, and make a good recovery.
7. Such preparation should never exceed four days at the outside.
8. Now that the operation mortality has been so greatly reduced by the employment of gas and oxygen, *operation is indicated as soon after the diagnosis as the necessary preparatory treatment will permit.*
9. The possible risk of performing an avoidable operation is negligible when compared with the prejudicial results of ineffectual prolonged medical treatment.
10. The most careful medical after-treatment is essential.

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MILK CONTROL AND TUBERCULOSIS.

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The control of milk which may be infected with bovine tuberculosis is so defective at the present time as to afford little or no protection for milk consumers. This is not because of a lack of enthusiasm amongst those who are supposed to exercise supervision over the milk supply, but because of their inability to effect the necessary reforms under the present legislation on this subject.

Milk which is suspected of spreading infectious diseases other than tuberculosis is comparatively easily controlled, because of the explosive outbreaks which such diseases usually give rise to. These outbreaks, when traced to a definite milk supply, can be prevented from further spread from that source by invoking the aid of the Infectious Diseases (Prevention) Act, Section 4. This Act gives the local authority power to make an order preventing the dairyman from supplying the milk in question within the district.

But with tuberculosis there is no explosive outbreak; the infection may be received in large doses for a considerable period, apparently without giving rise to any immediate symptoms of disease. Consequently, unless examinations of milk are constantly being made, the infection may be disseminated amongst the community.

If samples of the milk are frequently taken for bacteriological analysis, it may be asked, what benefits accrue? We are told that the microscopical examination of milk for acid-fast bacilli is of no practical utility, and that the only satisfactory method by which organisms, such as tubercle bacilli, can be detected with certainty in milk is by inoculating animals (guinea-pigs) with the suspected material. A period of approximately six weeks must elapse before a definite opinion can be given that the milk contains this bacillus.

If it is possible to trace the infection to its source (and in many areas the milk in the churn of the purveyor has been obtained from a number of herds widely separated and has been mixed at the dépôt or dairy, so that tracing the infection is almost an impossibility) one may find that each of the cows contributing its quota of milk is apparently in excellent health and shows no signs of tuberculous disease of the udder. One may be told that "a beast was recently sold because it seemed out of sorts," and further inquiries may show that the animal has changed owners several times in the comparatively short period of six or seven weeks.

Under the Market Fairs Clauses Act, 1847, the Public Health Act, 1875 (Sections 116 and 117), and the Public Health Acts (Amendment) Act, 1890, diseased, unsound or unwholesome food—including milk—may be seized and destroyed. Little assistance is obtained from these Acts, because it is impossible to show at once that the milk is diseased, and consequently further action is not possible.

Section 2 of the Dairies, Cowsheds and Milkshops Order, 1899, which reads: "If at any time disease, including in the case of a cow disease of the udder, is certified by a veterinary surgeon to be tuberculous, the milk from the cow shall not be mixed with other milk or sold for human food," conveys the impression that some assistance is given in dealing with such infected milk. It is important to remember that this is practically the only power under which tuberculous milk can be dealt with, and it will be seen that the help afforded by this Order is more imaginary than real.

Who is to ask the veterinary surgeon to inspect the animal? If the farmer or dairyman asks his advice, the fact that disease exists is not likely to be disclosed. Is the veterinary surgeon to be an employee of the local authority? I believe only one or two of the larger cities, of which Birmingham is one, employ full-time veterinary officers for this work. Unless the local authority concerned is prepared to recompense the owner for the slaughter of the affected cow, very little improvement can be effected, because the beast may not be slaughtered without the consent of the owner. Who is to see that the milk of the diseased cow is not mixed with other milk or sold for human food? The most careful supervision by an inspector could not prevent this mixing of the milk. Since the withdrawal of the Tuberculosis Order, 1914, no powers appear to exist whereby the owner of a milch cow which is infected with tuberculosis can be compelled to have it slaughtered.

Such, then, is a very brief survey of the powers that exist for the control of tubercle-infected milk. It has been shown that bovine tuberculosis can and does infect practically every part of the human body, especially during childhood, and the presumption is that this infection is derived from cow's milk.

1. Sir Robert Jones recently stated that half of the cases in a large hospital for cripples are tuberculous in character, and that two-thirds of the surgical tuberculous cases are infected with the bacillus of the bovine type, and only one-third with the bacillus of the human type.

2. In 1914 Eastwood and Griffith reported to the Local Government Board that in the dead bodies of 150 unselected children evidence of tuberculous infection was found in 62 per cent. of the cases.

3. Hamburger states that tuberculosis in the dead body rises from 15 per cent. in the first year of life to 70 per cent. between 11 and 12 years, and to 90 per cent. at puberty amongst the poorer of the population of large towns. That very many of the children are infected with the bovine type of bacillus there can be little doubt.

4. Dr. Inman states: "Cultures from all types of tuberculous disease in man showed that bovine infection was present in not less than 18.7 per cent. of the total number of cases. In phthisis the percentage of bovine infection was 1.4. Cultures from tuberculous neck glands in children during the first five years of life showed bovine infection in 85.7 per cent. of the cases examined, and between the ages of 5 and 10 years in 65 per cent. of the cases."

5. Stanley Griffith, in his recent report to the Medical Research Council on the bacteriological characteristics of tubercle bacilli from different forms of human tuberculosis, shows that 20 per cent. of the cases examined were undoubtedly bovine in origin.

6. Dingwall Fordyce states "he has never seen tuberculous disease of the middle ear and mastoid in breast-fed babies."

It is obvious, therefore, that very many of the cases of tuberculosis which occur are due to the bovine bacillus, and therefore might be prevented. With the powers that exist at the moment for controlling the milk supply, and with the very large number of animals infected with the disease, it will, I think, be generally agreed that there is ample opportunity for very many children fed on fresh cow's milk to receive large doses of the infection.

7. Sir John McFadyean estimates that amongst adult cattle the proportion affected with tuberculosis was more than 30 per cent. of the whole, and to eradicate the disease from cattle would mean the slaughter of from 750,000 to 1,000,000 cows or heifers.

8. Dr. A. W. J. MacFadden (Ministry of Health) concurs in the above estimate. He adds that 2 per cent., including those giving milk containing tubercle bacilli, are in such an advanced state of the disease as would bring them within the provisions for slaughtering made under the Tuberculosis Order. If this slaughter of the 2 per cent. were enforced it would therefore still leave 28 per cent. of the animals infected and capable of spreading the disease amongst the younger animals.

9. Sir Rubert Boyce, in 1898 and 1899, examining the milk supplied to Liverpool, found tubercle bacilli present in 6.6 per cent. of that produced in the town, and in 17.8 per cent. of milk sent in from the country.

10. Stenhouse Williams found that at least 2 per cent. of cows examined and apparently healthy were excreting tubercle bacilli in their faeces, and that in a dark place (like many of our cowsheds) this infection remained alive for at least twelve months, while on pasture land, or as liquid manure, it remained infective for four months at least.

It will be apparent, therefore, that in our cowsheds in the towns, and indeed amongst most herds, the possibility of the dissemination of the disease is infinite, and the wonder is that any of the animals escape. Apart from the infection of the human body with the bovine bacillus, when it is considered that the number of deaths from tuberculosis in the first year of life is probably much higher than 1 in 26 (Sir A. Newsholme), and that the total deaths from this disease in England and Wales amounts to approximately 50,000 per annum, it will be agreed that the most stringent regulations are urgently necessary to enable infected milk and diseased animals to be disposed of without delay.

The Milk (England and Wales) Order, 1921, made by the Food Controller provides for the sale of Grade A milk and Grade A (certified) milk. A licence for the sale of these is only granted when the herd from which the milk is produced is certified free from tuberculosis, as determined by the tuberculin test. Grade A (certified) milk, which is bottled milk, must also not show *B. coli* in 1 in 10 c.cm. in each of two tubes, or more than 30,000 bacteria per cubic centimetre, and must be delivered to the consumer not later than two days after the day of its production. Thus for those who can pay the extra cost there is produced a milk guaranteed free from tuberculosis. Unfortunately this order only provides increased immunity for the wealthy, and does not assist the poorer people amongst whom the disease occurs in greatest numbers.

What is urgently necessary is that the Tuberculosis Order, 1914, withdrawn as a war measure, and the Milk and Dairies (Consolidation) Act, 1915, be made operative at once. The Tuberculosis Order, 1914, which has for one of its objects the destruction of all bovine animals showing signs of tuberculosis, provides for the following: (1) Every person having in his possession or charge any cow which appears to be suffering from chronic disease of the udder, (2) any bovine animal which appears to be suffering from tuberculous emaciation, or (3) has a chronic cough and shows definite clinical signs of tuberculosis, shall forthwith notify the police or local authority, and after examination if it is considered to be tuberculous it will be slaughtered. The suspected animal must be kept isolated under the charge of the owner until it is examined, and the milk must not be mixed with other milk, etc.

The Milk and Dairies (Consolidation) Act, 1915, which is to come into operation within one year after the termination of the war, would give power to: (1) Stop a supply of milk which is thought to have caused or is likely to cause tuberculosis. (2) Make obligatory the inspection of cattle in dairies by the medical officer of health, if the milk is suspected of being tuberculous. (3) Prohibit the sale of tuberculous milk. It is an offence to sell milk from a cow suspected of being tuberculous. (4) A medical officer of health in whose area milk is being sold may require the medical officer of the area in which the milk is produced to take samples, etc.

With these two measures (Tuberculosis Order, 1914, and the Milk and Dairies (Consolidation) Act, 1915) in force it would be possible for local authorities to appoint veterinary surgeons to carry out the examination of dairy cattle in their area by tuberculin and other methods. Milk would be sampled for the purpose of detecting tubercle bacilli, and this traced to its source would enable the authority, through their veterinary officer, to have the affected animal disposed of (and compensated for) under the Tuberculosis Order. With the support of these two measures an attempt might be made to deal with the problem of tuberculous cattle and their milk. There can be no question of the urgency of the matter.

DISCUSSION.

Dr. SCURFIELD said the position was very difficult. There was practically no Grade A certified milk, and even if we got pasteurized milk on lines similar to those adopted in America, bacteriologists doubted if twenty-five minutes' heating at 145° F. was sufficient to kill the tubercle bacillus. Home boiling of milk often impoverished it by the removal of fat with the skin.

At the present time he thought dried milk was the only safe milk on the market. We used far too little milk, and he believed a greater consumption of milk would do a lot to prevent rickets. Dried milk was more easily digested by infants, the fat-soluble A vitamin was apparently not damaged by the process, and the damage to the anti-scorbutic vitamin, if any (which Hess seemed to doubt), could easily be counteracted. He thought he could say that, after an extensive use of dried milk, the risks of scurvy and rickets arising from its use were *nil*.

An inquiry begun in Sheffield recently had led him to believe that rickets often began after weaning or the cessation of bottle feeding, because the "toddler" did not get enough of the right kind of fat, and was frequently fed on white bread, jam, and margarine—a dietary which would cause rickets in puppies. He thought our children needed much more safe milk.

DEMONSTRATIONS.

ON Thursday, July 21st, at 3 p.m., in the Ministry of Pensions Hospital, Mr. A. M. MARTIN (Newcastle) gave a demonstration on congenital dislocation of the hip: late results. He described his methods of reduction and after-treatment, and showed cases illustrative of his methods and two late cases where an excellent result obtained in each. An informal discussion followed.

Afterwards cases of congenital lesions of the heart were shown in Dr. Hume's wards in the infirmary.

On Friday, July 22nd, at 3 p.m., in the Ministry of Pensions Hospital, Mr. A. E. MORISON (Sunderland) gave a demonstration on cranioplasty, discussing the indications for this operation, the great improvement which followed it, and emphasizing the value of the preliminary excision of all scar tissue from the scalp, dura and brain, muscle graft of any cavity in the brain tissue, and an overlying fascial graft. He showed eight cases, with numerous skiagrams.

Dr. J. D. LICKLEY (Newcastle) then gave a demonstration on hydrocephalus, and discussed the pathology, symptoms, and treatment; he showed photographs, casts, and pathological specimens.

Dr. F. A. HORT (Sunderland) gave a demonstration on finer adjustment, with special reference to the hand, and discussed some suggested refinements in various methods of splintage. He showed models of splints and some very beautiful plaster casts, zoological and botanical.

THE expedition sent by the German Red Cross Society to Russia has reached Petrograd, whence it will proceed to the district of Kasan, and later to the Volga district.

PROFESSOR ORTH, who has hitherto been President of the German Central Committee for the Study and Control of Cancer, has had to resign on account of ill health, and his place has been taken by Professor Kraus.

THE Foundation Robert Koch for Combating Tuberculosis in 1920 granted 57,000 marks to authors of scientific works and 5,000 marks as prizes. The Foundation has 100,000 marks to dispose of in 1921.

THE annual grant of the American Pharmaceutical Association has been awarded to Professor Macht, of Johns Hopkins University. The grant is the income of 20,000 dollars, and is to be used by Professor Macht for the continuation of his researches upon certain synthetic compounds which have a sedative action.

THE Deputy Police Commissioner of New York, in his report for the quarter ending September 30th, states that though so far in 1921, 2,488 persons had been arrested for addiction to drugs, there were still 20,000 drug "addicts" at large in the city. The arrests for the quarter were unprecedentedly high, numbering 932, and of the 659 cases brought to trial 93 per cent. were convicted.

PERSISTENT PAIN IN LESIONS OF THE PERIPHERAL AND CENTRAL NERVOUS SYSTEM.*

BY

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Persistent pain, which may be defined as acute bodily discomfort, varying in degree from a sensation of soreness or aching to one of intense and intolerable agony of torment, may be due to a variety of diseases affecting primarily other structures and tissues than the nervous system. Thus carcinoma naturally occurs to us, or other malignant growth, as a probable cause of any deep-seated pain, persistent in character, and lasting for weeks and months, more especially if accompanied by progressive emaciation.

The appreciation of any sensation of pain due to visceral or bone disease necessarily involves the agency of the nervous system in the transference of the sensory impulses from periphery to thalamus and cerebral cortex, but I am limiting my remarks as far as possible to diseases involving the nervous system itself, and shall omit discussion of the referred pains of visceral disease, such as dental neuralgias, errors of refraction, angina, the colics, sinus suppuration, abscesses, acute inflammations, and the like.

For the sake of convenience I have in the following classification arranged the causes of persistent pain in diseases of the nervous system in five classes progressing from periphery to centre, or from nerve ending to cerebral cortex.

Causes of Persistent Pain in Diseases affecting the Peripheral or Central Nervous System.

1. *Peripheral* due to inclusion of nerve-endings in scar.
   - (*a*) For example, neuro-fibrositis, traumatic or rheumatic; adiposis dolorosa.
   - (*b*) Due to septic or to rheumatic terminal trigeminal neuritis:
     - (1) Chronic paroxysmal trigeminal neuralgia (Fothergill's disease, tic douloureux).
     - (2) Chronic neuralgia of upper or lower jaw.
   - (*c*) Geniculate neuralgia.
   - (*d*) Glossopharyngeal neuralgia.
2. *Disease involving Nerve Trunks.*
   - (*a*) Supraorbital neuralgia.
   - (*b*) Multiple neuritis.
   - (*c*) Brachial or sciatic perineuritis.
   - (*d*) Tumours or gummatous neuritis:
     - (1) Trigeminal.
     - (2) Spinal—for example, neurofibromatosis.
   - (*e*) Causalgia.
   - (*f*) Cervical or first rib pressure.
3. *Lesions of Posterior Root Ganglia or Posterior Roots.*
   - (*a*) Post-herpetic neuralgia:
     - (1) Trigeminal.
     - (2) Spinal.
   - (*b*) Tabetic neuralgia.
   - (*c*) Other root scleroses.
4. *Central Sclerosis of Fillet or Thalamus.*
   - Intra-medullary growths.
   - Syringomyelia and syringobulbia.
5. *Psychalgias.*

Neurofibrositis.—The pains of chronic or acute fibrositis of the lumbar or dorsal region, often known as lumbago and muscular rheumatism, are doubtless only too well known to many of us, though common as the affection is its pathology is largely a matter of conjecture. Violent and especially sudden muscular action is the exciting cause in a considerable number of cases, the sudden onset of intense pain immediately after a heavy muscular strain, such as a slip or fall when carrying a heavy weight, the pain relieved by lying down or sitting in a deep chair and aggravated immediately on movement, suggest rupture of muscle or tendinous fibres involving sensory nerve filaments as the cause. In the majority the pain disappears after a few days or weeks, while occasionally the disorder persists for years.

Recently I was consulted by a farmer, a powerfully built muscular man, who some ten years ago slipped and fell when carrying a sack of wheat weighing about 260 lb. He was immediately seized with acute pain across the lumbar region, and more especially in the neighbourhood of the right posterior iliac spine. He has been subject to this pain ever since off and on, worse on movement or during heavy lifting, and now and again he is subject to exacerbations so severe he can scarcely move or dress himself. When I saw him during such an attack his spine was flexed laterally towards the right, and there was a small circumscribed area of great tenderness on deep pressure over the right posterior iliac spine. Careful marking of the site of chief tenderness, followed by injection of a few minims of 90 per cent. alcohol deep into the tender area, completely relieved his pain within fifteen or twenty seconds, so that he was able to stand up straight, the lateral flexion of the spine having now disappeared and he walked away in comfort.

Acupuncture has long been recommended since Sydney Ringer's time for similar conditions, but if one or more definite areas of tenderness on deep pressure are discovered, I consider that alcohol puncture is far more valuable.

Traumatic neurofibrositis may involve larger nerve trunks, not nerve filaments only, and sciatic perineuritis is a fairly common early sequel to fibrositis of the lumbar region, whether this is of rheumatic origin or due to a fall or other injury. Here again the pain may continue for months, or even years. Sciatic perineuritis as a sequel of muscle strain or fall is particularly amenable to treatment by massive saline injections into the nerve just below the notch, the probable site of the nerve sheath damage. Alcohol injection of the sciatic must of course never be attempted, owing to the certain result of paralysis of the foot which would ensue, but saline injection of 50 or 60 c.cm., preceded by 2 c.cm. of 2 per cent. novocain into the nerve often cures the sciatica immediately. This treatment, though often valuable, is less certainly successful in the rheumatic sciaticas, possibly owing to the large area of the nerve which may be the seat of trouble. In both the rheumatic and the traumatic sciaticas, there are frequently spots of deep tenderness with aching pain either in the neighbourhood of the trochanter or between the notch and the iliac crest, which may keep up the discomfort and pain after the actual sciatica has been relieved. These are probably local areas of neurofibrositis in the glutei or erector spinae, and may be mostly successfully injected deeply with alcohol, after the nerve itself has been treated with saline injections. The saline injections may relieve by breaking apart laterally adhesions of the nerve sheath, as the sciatic nerve is a loosely built nerve and readily takes the fluid, swelling up like an egg at the site of injection (as may be seen by injecting the nerve after exposing it on the *post-mortem* table).

Paralysis of the sciatic I have never seen as a result of violent muscular action, but in the region of the brachial plexus local paralysis from involvement of the posterior scapular, long thoracic, or circumflex nerves may occur. As with sciatica, so *brachial perineuritis* may occur from muscular overstrain, or rheumatism and other toxic causes, such as pyorrhoea. Usually the posterior cord and musculo-spiral nerves suffer most. As in the lumbar region, so also in the neighbourhood of the scapula, and sometimes in the forearm, areas of deep tenderness may be the sole cause of chronic wearing pain, or may accompany a more extensive brachial neuritis. Alcohol puncture of such tender spots often has most brilliant results, chronic pain that may have persisted for many months or years being relieved instantaneously. The spots must be carefully located and marked, and a fine needle—hypodermic size is usually long enough—plunged vertically into the spot down to the level of the rib or scapula. Care must, of course, be taken that the needle does not pass between the ribs and pierce the pleura.

Bruising of the scalp by an injury to the vertex from a blow against the lintel of a door or fall of a heavy weight is sometimes followed by persistent headache, varying in intensity, or periodic and associated with a local area of tenderness on pressure. These cases also may be relieved by the same treatment. This form of headache must be distinguished from migrainous neuralgia, in which the periodic headache is unilateral, and often associated with intense pain and tenderness on pressure on one temple. Alcohol injection in these cases is quite useless, as is only to be expected, the origin of the pain being probably central and not peripheral.

Chronic paroxysmal trigeminal neuralgia is certainly of peripheral origin, and is probably due to septic neuritis of nerve filaments in the maxilla or mandible. Scarcely

* Being the opening paper at the joint meeting of the Neurological and Surgical Sections of the Royal Society of Medicine, November 10th, 1921.

ever does this disease affect the upper division and supra-orbital alone, but it may be involved along with the second division.

John Fothergill's original description, nearly a hundred and fifty years ago, of the painful attacks is scarcely to be improved on to-day, though his view of its pathology, thinking that it must be cancerous because of the long-standing pain, is now discarded. Many causes appear to contribute to its appearance. Heredity of the disease I have met with in about 1 per cent. of my cases. Strong emotion may precipitate an attack. Injury and blows on the jaw are a not infrequent cause, as may also be exposure to severe chill, as in motoring or driving; a septic antrum has preceded typical tic douloureux of the second division too often to be a coincidence. I find the disease twice as frequent in women as in men, a point also noted by Fothergill, though he saw only sixteen cases in his practice—or business, as he calls it. A curious point my statistics show is that the disease is twice as frequent on the right side as the left, and commoner in the upper than the lower jaw, though both are often affected. The larger incidence on the right side may be due to better use of the toothbrush on the left side of the mouth, as would be natural in right-handed people, according to Mr. Warwick James. Bilateral trigeminal neuralgia is comparatively rare. I have met with it perhaps thirty times only among several hundreds of cases. The disease rarely disappears spontaneously when established; I have known this occur only once, in the father of a sufferer from this disease, who was my patient. Her father suffered for twenty-five years until he was 90, but was free for the last fifteen years of his life, living to 105. In the early stages, however, long periods of remission may occur; I have known thirty years elapse between the first and second attacks, and intervals of one or two years are common. Sometimes a certain periodicity is seen, as for a few weeks to three months every autumn or winter. As the years pass usually the intervals of freedom get shorter. In a few there is practically no remission, agonizing pain inevitably following every movement of the face, as in eating or in washing. One of my patients, a lady, had been unable to wash the right side of her face for twenty years.

Often the lightest touch of a hair or draught of air will start a paroxysm, though at other times nothing may provoke the pain. During the painful bouts the prick of a pin usually seems more acute on the affected side, though this is a temporary hyperaesthesia only, and is not present between the attacks.

Fothergill, 150 years ago, thought hemlock pushed to toxic doses was a cure for this complaint, but our experience nowadays is that drugs comparatively rarely are of service, and that real relief is obtained only by a solution of continuity of the offending nerve trunk. Practically the choice, in severe cases of pain, is between gasserectomy or division of its sensory root, both severe operations, on the one hand, and alcohol injection of the nerve trunks at their deep foramina, or injection of the ganglion itself. For bilateral cases of this neuralgia the gasserectomy operation is not permissible, owing to the jaw drop that would ensue, though bilateral destruction of the ganglion by injection may be done, as the motor root then recovers, though the sensory ganglion cells are permanently destroyed. A curious point I have often noticed when injecting the foramen ovale and ganglion is that the ophthalmic or inner portion of the ganglion goes totally anaesthetic before the second division, and it may be extremely difficult at times to get total anaesthesia of the cheek when the forehead and eyeball remain permanently anaesthetic. I have no satisfactory reason to account for this.

Another puzzle that occasionally arises, though fortunately it is rare, is the partial recurrence of sensation on the chin and remainder of the third division, when the first and second divisions remain totally anaesthetic. With this reappearance of sensibility pain may return, and that this is not necessarily the result of faulty injection is proved by the fact that gasserectomy and division of the sensory root behind the ganglion may not alter the conditions. One is tempted then to call the persistent pain a psychalgia, but that this is so I am not convinced, as there is no doubt true sensation on the lower lip and chin. Gasserectomies, of course, like other operations, may sometimes fail through being incomplete; I have seen several such cases where pain has returned after about ten years, with reappearance of cutaneous sensibility, yet I do not think that is the explanation in the few cases above referred to, though no such case that I am aware of has come to autopsy.

Another form of *persistent trigeminal pain* that I have seen many instances of is, in my experience, peculiar to young women. It is continuous, not paroxysmal, though it may vary in severity, and it affects either the upper or the lower jaw. It is not provoked by eating, laughing, washing, or other movements of the face, as is true tic douloureux. It is more difficult to relieve by alcohol injection than spasmodic tic douloureux, inasmuch as total anaesthesia is necessary to abolish the pain, and with commencing regeneration of the nerve the pain recurs. In tic douloureux, however, in a large majority a medium anaesthesia from injection may be sufficient to abolish the pain, in some cases for many years; in one of my early cases there has been no recurrence twelve and a half years after injection of the foramen ovale, though only light anaesthesia now remains. This lady had previously suffered from typical tic for twenty years, section of the inferior dental nerve having given only two years' relief. In her case the neuralgia commenced at 17, and I have seen it commence at 17 in two other cases, and once at 16, many in the twenties, but most commonly about the age of 50.

On the other hand, the type of persistent neuralgia of upper or lower jaw previously described I have met with only in women of 15 to 35. Its cause I am very uncertain about, unless it is a chronic osteitis of the jaw. Its limitation to women I do not understand, as the sufferers I have met with have not been notably of neurotic type. Moreover, the true tic douloureux is undoubtedly much more frequent in women than in men—about two to one. These cases are more difficult to treat than true trigeminal neuralgia, as nothing short of total nerve destruction cures the pain.

Geniculate neuralgia, or neuralgia affecting the distribution of the sensory fibres contained in the seventh nerve, has been fully described by Ramsay Hunt and others, though some deny the association of the seventh nerve with such neuralgias. Transient pain around and behind the ear, lasting for two or three days, is a commonplace in association with the onset of facial palsy, and often precedes the motor paresis. Much rarer are instances of true herpes zoster affecting the auricle in association with facial palsy. The distribution of the herpetic rash is usually on the concha and antihelix, though it may be found behind the ear where the pinna joins the scalp, and also along the posterior wall of the exterior auditory meatus. Such a distribution of herpes I saw once in a medical man, without facial palsy, who for many weeks afterwards had excruciating paroxysmal neuralgia affecting the ear, front of the ear, and back of the lower jaw and neck. Pierce Clark and Taylor of America describe a case of chronic tic douloureux affecting this area which was cured by operation by trephining and dividing the pars intermedia Wrisbergi, or sensory root of the seventh nerve, intracranially.

Glossopharyngeal Neuralgia.—A rare form of chronic paroxysmal neuralgia or tic douloureux may affect the glossopharyngeal nerve. In its paroxysmal suddenness of onset, and in the severity of pain, glossopharyngeal tic is identical with trigeminal tic, for which it may easily be mistaken. Distinguishing it, however, from the latter, the pain in glossopharyngeal tic starts in the throat, in the region of the tonsil and anterior pillar of the fauces. The pain radiates to the ear, and especially just in front of the ear, along the back of the mandible, and into the upper part of the neck. I have met with two only of these cases, both of which had lasted over ten years, one a man aged 40, the other an old lady of 87. As in trigeminal tic, the first onset of the pain may be furious and sudden, in the man's case the pain striking him in the throat as he opened his mouth to eat a sandwich. When I met with these cases, now ten years ago, I knew of no reference to glossopharyngeal neuralgia, and in case the pain might be an unusual form of trigeminal neuralgia I injected the third division at the foramen ovale in each case, quite successfully as regards destroying this branch, but without influencing the recurrent neuralgia. I have since seen somewhat similar spasmodic pain, with intense hyperaesthesia of the side of the neck, in a case of recurrent

epithelioma in the tonsil, following seven years after extirpation of a vocal cord for malignant growth. It was this case which convinced me of the identity of glossopharyngeal tic in the two previous cases referred to, and I have lately seen a description by Sicard in France of three cases met with during the war of glossopharyngeal neuralgia, which were cured by surgical help in division of the nerve in the neck.

Diseases Affecting Nerve Trunks.

Supraorbital Neuralgia.—Persistently recurrent supraorbital neuralgia is met with in both sexes, though oftener in women. I assume that migrainous and true trigeminal neuralgia, and the peripheral causes, such as errors of refraction, frontal sinusitis, frontal herpes, antral abscess, and dental neuralgias, have been excluded. Sometimes paroxysmal supraorbital neuralgia occurs daily, coming on about the same time, perhaps 10 or 11 a.m., and lasting until 5 p.m. I have seen this type follow influenza several times. Usually the pain is limited to the supraorbital nerve, but it may involve the whole of the ophthalmic branch.

In a recent case, a woman of 47, pain began four years ago, lasting for eight hours daily from January to June. Next year and the year after a similar repetition occurred. A year ago she had a more severe attack, and since then has had pain daily from 12 noon to 5 p.m., never a day free. The pain is situated in the forehead and left side of head as far back as the coronal suture, and extends along the left side of the ridge of the nose. Unlike trigeminal neuralgia, the pain is not evoked by talking, eating, or other movements of the face, or by rubbing. Supraorbital injection gave little or no relief, though deep anaesthesia was produced. Injection of the Gasserian ganglion was then done, the anaesthesia of the first division being total for an hour or more, but subsequently wore off partially. The neuralgia disappeared completely for several days, and then reappeared in a much attenuated form. Very probably total destruction of the ganglion would have produced a complete cure of the neuralgia.

Perhaps the majority of paroxysmal supraorbital neuralgias are migrainous in type, for which alcohol injection is of little or no use. In some subjects this migrainous periodic neuralgia is limited to the temple.

Only comparatively rarely does true trigeminal neuralgia invade the first division of the fifth nerve—that is to say, a paroxysmal neuralgia, sudden and intense, and brought on by movements of the face, rubbing of the skin, or even a draught. In only one instance have I seen it remain limited to the first division of the fifth nerve for years without either the second or third division becoming involved, and even in this case rubbing the chin would start the pain in the forehead. Practically always the neuralgia also involves the second, or even all three divisions, when the supraorbital distribution is involved, though it is to be remembered that the pain in the second division of the fifth frequently, indeed generally, extends above the eyebrow and in front of the temple. In all cases of persistent or recurrent pain anaesthesia must be looked for. If it is present in trigeminal cases then either syphilitic neuritis, gumma, or tumour is the cause.

Chronic pain in the distribution of the trigeminal nerve may be due to tumours or gummata involving the sensory root of the fifth nerve within the skull or one or more of its branches externally. Tumours in the ponto-cerebellar angle may irritate the sensory root of the fifth and simulate trigeminal neuralgia for years. The pain, however, though variable, is less spasmodic and not brought on by light touches or movements of the face. The main point in distinguishing lesions of the trunk or main branches from trigeminal neuralgia is the appearance of diminished sensibility in the affected area. Motor palsy of the muscles of mastication also may be present. When these signs of gross damage to the fifth nerve are found trigeminal neuralgia may confidently be excluded, unless neurectomy or alcohol injection has previously been done. Peculiarly distressing cases to deal with are the nasopharyngeal growths, causing persistent pain and increasing anaesthesia of either the second or third divisions of the fifth. When the growth invades the zygomatic fossa and involves the third division deafness of that ear is usually produced by involvement of the Eustachian tube. When the growth is more central and invades the spheno-maxillary fossa, besides involving the second division of the fifth, there is produced presently diplopia, and later proptosis and fixation of the eyeball, through extension into the back of the orbit. Beyond anodyne remedies I know nothing that relieves these cases. Operation seems useless; the growth is never circumscribed and always recurs. In *malignant growths of the maxilla* pain may be exceedingly troublesome, even after excision, due to recurrent growth. This pain may be completely relieved by a successful alcohol injection of the Gasserian ganglion. Similarly the agonizing pain due to *carcinoma of the side of the tongue* and lower jaw may be completely arrested by alcohol injection of the third division of the fifth nerve at the foramen ovale.

Persistent trigeminal pain for weeks and months, nonspasmodic, and accompanied by diminished sensibility of that side of the face, but without the pressure signs above referred to of Eustachian deafness, proptosis, and diplopias, should suggest *gumma* as a probable cause. Even if the Wassermann reaction be negative it is well always to give antisyphilitic treatment a trial. I have met with several such cases of syphilitic trigeminal neuritis which cleared up completely under treatment by biniodide of mercury or salvarsan injections.

Rib Pressure on Brachial Plexus.

Chronic pain in the arm and neck, running down to the inside of the hand, in women between 20 and 30, will usually suggest cervical rib as a cause, through pressure on the first dorsal nerve as it rises to join the inner cord. Wasting of the musculature in the hand and diminished sensibility along the inner border of the forearm to the wrist renders the diagnosis more certain. If a skiagram demonstrates a cervical rib, the position is clear. Many cases of rib pressure due to the first rib alone, in the absence of a cervical rib, have been recorded; I have had two such cases successfully relieved by operation within the last six months. In one of them the first rib caused a prominent hard swelling above the clavicle, which it was difficult to believe was not a cervical rib when the skiagram proved the absence of the latter. The diagnosis is therefore more complicated and difficult now that we must realize that with symptoms suggestive of cervical rib the skiagram may be normal.

Causalgia.

During the war the frequency of cases of persistent agonizing pain due to injuries of nerves, often slight, was most remarkable. The large majority of these cases involved the median or internal popliteal nerves, though I have seen it also in the distribution of the ulnar, long saphenous, external cutaneous of the thigh, and radial nerves.

In some cases the nerve injury was so slight that no demonstrable anaesthesia was present, only an intense hyperasthesia, varying at times, and liable to be aroused into an intense spasm of pain by a sudden emotion, noise, or vibration, or light touch, thereby reminding us somewhat of the onset of the paroxysms in trigeminal neuralgia. The pain is described as of a burning heat, hence the name causalgia (καίω, I burn), and bursting sensations in the fingers were common. The pain in many cases lasted for weeks and months, and in some it was necessary to produce nerve blocking in order to arrest the pain, by alcohol injection of the trunk of the nerve above the injury. Common enough during the war, I have seen only one such case in civil life, where a man tore his thenar eminence in some cogwheels two years previously. The pain was limited to the ball of the thumb, and immediate and complete relief was obtained by injecting the median nerve with alcohol just above the wrist. The nerve can be easily found here as it lies between the tendons of the flexor carpi radialis and palmaris longus, and pricked with a hypodermic needle and injected. No open operation is necessary for this.

Painful stump was another very common sequel of amputation in the war.

Brachial and Sciatic Perineuritis.

Sciatica I have already referred to, especially in association with lumbo-sacral fibrositis, either of a rheumatic, septic, or traumatic origin.

A very chronic and obstinate type of sciatica I would like to refer to here, in which the most noticeable sign on examination is *scoliosis*, a lateral flexion of the spine away from the painful side causing the hip on the affected side to stick out. The lower cervical spine may be as much as 5 inches to one side of the vertical median line when

standing. This scoliosis disappears on sitting or lying. It is a result of a local lumbar fibrositis in the erector spinae in the region of the fourth and fifth lumbar transverse processes. Occasionally a definite area of deep tenderness can be localized, and it is sometimes possible to procure an immediate and dramatic relief by alcohol puncture of the spot. Short of that treatment these cases are very chronic and resistant to ordinary treatment, and three months' rest in bed may be necessary to effect a cure.

Brachial neuritis is seldom so chronic as some of the sciaticas, though the acute form is probably more painful, due, I think, to the structure of the cords of the brachial plexus being denser and firmer than the sciatic, and thus admitting of less swelling in inflammation of the sheath. This point is easily demonstrated in the dead body by cutting down on the sciatic and brachial nerve trunks and injecting fluid through a hypodermic needle. The sciatic takes it easily and swells up in an egg shape, but it is difficult to force more than a few drops into the main brachial trunks.

Chronic pain about the scapula and arm may be due to cervical rib or to neurofibrositis, as already stated. A common cause of pain referred from the shoulder down the arm, perhaps to the elbow, its maximum usually about the insertion of the deltoid, is *adhesions in the shoulder-joint*, the result of some slight injury, such as straphanging, being jerked by getting on or off a bus or tram, or by a slight fall.

These cases are frequently diagnosed as neuritis. The pain starts usually a day or two after the injury, and is due to a synovitis, the subsequent adhesions causing pain with every movement or pressure on the joint. Wrenching under gas, with subsequent passive movements and massage, usually effects a cure, but some cases are too painful to tolerate the after-treatment and partial fixation is permanent. To be distinguished from this condition is the fixation of the shoulder from adhesions subsequent to immobilization during the acute stage of brachial neuritis. The history of severe pains and pins-and-needles down to the fingers generally makes this point clear, but the treatment by massage, passive movements, or even wrenching under gas is the same.

Disease of Posterior Spinal Roots or Root Ganglion.

Post-herpetic neuralgia is one of the most inveterate and difficult neuralgias we have to treat. Due in part to an inflammatory lesion in the root ganglion, in some cases to a neuritis of the nerve trunk, and in others even to inflammatory changes in the grey matter of the posterior horn in the spinal cord, the pain is constant and wearing, causing great depression. Rare under the age of 50, chronic neuralgia following an attack of shingles is increasingly common in older people. In some the pain may persist for months and then gradually disappear, but in others it may remain for years, and has led to suicide. With the pain is usually a severe numbness and sense of constriction, and the area of scarring is usually partially anaesthetic. Beyond local anodynes and mild tonic treatment, I hesitate to suggest more active measures. Alcohol injection in spinal cases is, I believe, quite useless, and division of posterior roots after laminectomy is, I believe, not always successful. I should be glad to hear experiences of surgeons on this point.

Herpes of the trigeminal area is mostly limited to the ophthalmic division, often called *frontal herpes*. A common sequel is numbness, sensation of constriction and paraesthesiae, or formication, not really amounting to pain. Occasionally, however, in old people subsequent neuralgia in the anaesthetic area is very distressing and persistent. For this, alcohol injection of the Gasserian ganglion may give complete relief, and I have done this in three such cases, but it is necessary to produce total and lasting anaesthesia equal to that resulting from a gasserectomy.

Chronic pain in the limbs, usually the lower limbs, may result from posterior root sclerosis, subsequent to meningitic lesions. *Haematorrhachis*, or intraspinal haemorrhage in the lumbo-sacral region, may result from heavy muscular effort. The effused blood is apt to clot around the roots of the cauda equina and cause chronic irritation and pain in one or both lower extremities, with wasting and loss of reflexes, and possibly diminished sensibility. Lumbar puncture will clear up the diagnosis, a straw-coloured cerebro-spinal fluid being drawn off even a year or more after the onset. In one such case I had laminectomy performed, and a large purple clot 4 in. long surrounding the roots of the cauda equina removed, eighteen months after the injury.

Tabetic pains are too well known to need enlarging on here. Their treatment is perhaps less satisfactory. Mercurial friction improves some, intravenous salvarsan yet others, while for those who do not notably improve under salvarsan only I have seen considerable numbers benefit immensely as regards severity of pain by intraspinal injections of the serum taken from the patient's blood after intravenous salvarsan. Usually there is a strong reaction about two hours after the injection of 50 to 55 c.cm. of the serum, severe pains in the limbs coming on and lasting twelve to twenty hours, followed by more or less complete relief, which may last for years. Presumably the injection of the serum sets up some congestive reaction in the posterior nerve roots which acts beneficially on the chronic syphilitic neuritis which is the source of the pain. Root sclerosis may be due to other causes, such as haemorrhage, toxic degeneration in diabetes, and other causes of neuritis.

Intramedullary Lesions.

Proceeding centrally, we find chronic neuralgic pain resulting from intramedullary lesions affecting the fillet and thalamus. Usually the pain is constant, burning and pins-and-needles in character, but occasionally it is paroxysmal and neuralgic.

More than ten years ago I showed before the Neurological Section a man of over 60 who had suffered from an attack of thrombosis of one posterior inferior cerebellar artery. As a result of the thrombosis, implicating the side of the medulla with the fillet and the descending or spinal root of the fifth nerve, there was analgesia of the left fifth nerve area and of the right half of the body excluding the face and the forehead. In the analgesic area of the left fifth he complained of constant neuralgic pain, which nothing appeared to relieve. It is, perhaps, difficult to understand how a simple sclerotic lesion can cause persistent neuralgia in the absence of any irritating focus, and this is the only instance of this posterior inferior cerebellar syndrome which I have seen with permanent neuralgia resulting, though this particular thrombosis does not appear to be very rare, as I have met with twenty or more cases.

It has been suggested that the persistent burning pain and paraesthesiae in lesions of the thalamus or fillet is due to the spontaneous unrestrained activity of these nuclear centres for sensation. Similar pain is met with in some cases of syringomyelia and syringobulbia, the pain being referred to analgesic areas, an analgesia dolorosa. Intramedullary spinal tumours also are liable to cause a burning pain as an early symptom, which may precede for many months any more definite localizing signs.

Psychalgia.

Pain of mental origin is usually distinctive in character, such as the vertical pressure pain or clavus hystericus of some neurasthenic headaches. A mental neuralgia may usually be distinguished from a true neuralgia of peripheral origin by its distribution not being anatomical in form and overlapping other nerve areas, and especially in crossing the middle line.

A parson, aged 63, for two and a half years has had pain in the right great toe. Of three surgeons who saw him, one operated for exostosis, the second excised the joint, the third told him he had a kink in his colon, but let him off with an abdominal belt and paraffin internally, and advised him to get a tendon cut. In spite of all treatment—or because of it—his pain is now much worse. On inquiring into his history, I found he was the child of first cousins, and that insanity was very prevalent in his family. As I could see nothing wrong with his foot or leg, I have little doubt that this pain was an instance of psychalgia.

With the psychalgias may, perhaps, be included many of the *coccygodynias*, though perhaps in the majority of them there is a history of some local injury at the outset.

Occasionally there may be difficulty in diagnosis, as in the following case:

This was a Jewish patient whom I saw for pain on the left side of the cheek and forehead and nose, but crossing the nose as far as the inner canthus of the opposite eye. He was anxious for injection treatment, and as he had had much medicinal treatment without benefit, somewhat against my better judgement I injected the second division of his fifth nerve. Although dense anaesthesia resulted, the pain was not improved, being

indeed rather worse. I then hesitated between advising suggestion treatment and injection of the Gasserian ganglion. He would not have the former, and, again against my better judgement, I injected him, this time through the foramen ovale, producing total and permanent fifth nerve anaesthesia. His eye and cornea fortunately gave no trouble, but he was now even more complaining of the pain, and he therefore went to see a surgeon regarding gasserectomy, who, however, refused to do the operation when he found the fifth nerve area totally anaesthetic. Baulked in this, he went to yet another surgeon, who operated to remove his ganglion; but the last I heard of him was that he was complaining even more of pain.

The moral of this tale is that it is unwise to attempt any form of surgical treatment for psychalgias, the pain is apt to get worse, or spread to another area, and once an operation has been performed, it is most difficult for another practitioner to sift the real from the false and to make a diagnosis.

A CASE OF PYOCELE OF THE FRONTAL SINUS.

BY

J. A. GIBB, M.B., M.Ch.,

HONORARY SURGEON, KENT COUNTY HOSPITAL FOR DISEASES OF EYE, EAR, NOSE, AND THROAT, MAIDSTONE.

On May 18th, 1921, I was asked by Mr. Potts, ophthalmic surgeon to this hospital, to examine a patient, a married woman, aged 57, for frontal sinusitis. She had a slight swelling at the inner canthus of the left eye, and complained of some "pricking in the left eye," but not of headache or any other subjective symptom.

The swelling was firm and could not be pressed away. Intranasal examination showed no discharge on either side; the mucous membrane was quite normal in appearance and there was no enlargement of the turbinate bones. The post-nasal space was also quite clear of any discharge. Transillumination showed both frontal sinuses clear and of about normal size; the maxillary antrum was also clear; there was no history of a blow. My report was that the frontal ethmoid and maxillary sinuses were unaffected.

Three months after this the patient was admitted into hospital with a compressible swelling on the left frontal sinus. The house-surgeon, Mr. Reed Hill, needled it and got pus. There were no subjective symptoms such as headache, etc.; the temperature was negligible. The eyeball was pushed downwards and outwards, with swelling of the soft tissues of the upper eyelid and inner angle of the orbit.

Operation.

I operated as soon as the patient could be got ready, making an incision along the eyebrow; there was an immediate gush of odourless reddish muco-pus. A gloved finger was inserted into the cavity, which was felt to be unusually large. I therefore made a further incision at right angles to the original at its inner angle, going well up the forehead; the flap was turned upwards, the cavity swabbed dry, and all bleeding arrested.

It was then made clear that the anterior wall of the frontal sinus, with the exception of a thin pliable piece of bone adherent to the flap, was absorbed. The floor (except for a small plate of bone over the orbit), the posterior wall, and the septum between the two sinuses were also absorbed, so that the right frontal sinus could easily be explored. Portions of dura mater were missing, and brain substance, looking red and inflamed, was exposed. A probe could be passed on either side into the nose; the posterior ethmoid cells were absorbed. The fronto-nasal duct could not be made out, and the probe could be passed down to the loop of the post-nasal space, the muco-periosteum everywhere being intact, except where the orbital plate had been absorbed; here the probe passed into the cheek. The sagittal sinus was intact, but the whole of the left frontal lobe of the brain was completely exposed and, if it had been desirable, could have been raised and its under surface explored. The wound was sutured with the exception of its outer and inner angles, which were drained.

Recovery was gradual, and the temperature and pulse negligible throughout until, at the end of three weeks, a pocket of pus, quite different from the original infection, formed under the scalp at the inner angle of the original incision and extended down to the cheek. This was opened, gently scraped, and swabbed out with hypochlorite solution. The patient is now quite well.

I deemed it unnecessary and inadvisable to open up any communication with the nasal cavities, as I felt that the cavity would in all probability become filled with fibrous tissue.

The case was shown at the local Branch of the British Medical Association, and I expressed the opinion then that the condition was a mucocele of the frontal sinus which had become infected. The recent Hunterian Lecture by Mr. Howarth, published in the *Lancet* of October 8th, has impressed me with the fact that the condition is not as uncommon as I at first deemed it to be; nevertheless the publication of this case may be of some interest.

The following details of the eye condition, as recorded by Mr. Potts, were supplied to me by Mr. Reed Hill:

The patient attended hospital on May 14th, complaining of slight discomfort behind the left eye. On examination, R. vision = 6/6, L. vision = 6/12, no hypermetropia; a small swelling was felt below the left supraorbital notch; some slight proptosis was present, and displacement of eye downwards and outwards, but no diplopia. Examination of the fundus revealed no pathological changes.

On re-examination four months later, the eye was observed to have returned practically to its normal position. The proptosis had disappeared, and there was very slight displacement of the eye downwards, the level of the left pupil being about two millimetres below that of the right. Fundus, optic disc and media were quite normal. It was found that the patient had an error of refraction which when corrected gave R.V. $\bar{c}$ + 1.25D cyl. axis vert. = 6/6; L.V. $\bar{c}$ + 1.25 D cyl. axis ∠ 70° = 6/9. On testing for heterophoria the left image was found to be situated above and to the right of the right image, but they were approximately fused by a 12 Δ prism base upwards and inwards.

The extrinsic muscles appeared not to have been affected, as there was no limitation of movement of the eye. The fields showed no contraction, nor were there any scotomata to be made out with either white or colours.

SUTURE OF SEVERED MEDIAN NERVE, WITH RAPID RECOVERY OF FUNCTION.

BY

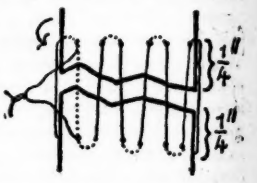
EDGAR WIRTH, M.D.Malta,

ESSEX COUNTY HOSPITAL.

A boy, aged 14, on May 28th, 1921, thrust his arm through a window pane, severing the internal and part of the external belly of the biceps and coraco-brachialis muscles, the brachial artery and vein, and the internal cutaneous and median nerves. First aid was luckily at hand, a tourniquet was applied and the boy sent to the hospital.

Examination of function revealed complete loss of power in all the muscles, and loss of epicritic, protopathic and deep sensibility in the area supplied by the median nerve. The latter was severed *en bec de flute* without irregular tags.

I ligatured the brachial artery and vein and freed the median nerve at the proximal and distal ends. By means of a fine suture of chromicized catgut exact adaptation of the ends was aimed at, with the view of bringing each proximal fibre in contact with its own distal fibre, as far as could be expected. This was obtained by rotating the ends of the divided nerve on their axes. A zigzag suture of catgut was then introduced all round the nerve, taking into each stitch-loop only the sheath, and no nerve tissue, and in such a manner that all the longitudinal threads lay on the outer surface of the nerve like a tube. For this purpose the sheath was transfixed twice at each bend of the gut, in a transverse direction, thereby minimizing the danger of cutting through.



Through the retraction of the sheath, which ensues in such cases, the protruding nerve fibres tended to slip out from between the bars of this cylindrical fence of catgut, and had to be pushed back with a probe. I did not find this method of suturing difficult, nor did it take much time. I believe that the non-inclusion of nerve tissue in the stitch and in the complete retention of the prolapsing fibres by numerous threads of catgut all round, which at the same time secured accurate adaptability of the ends, may have a lot to do with the rapid restoration of function.

A glove drain was left in the depth of the wound, the arm put up in a flexed position and at complete rest on a pillow. Healing was uneventful.

Two days after the operation I was surprised to find that the patient showed distinct improvement in some of the movements controlled by the median nerve, as, for instance, better flexion at the wrist, much better pronation of the forearm, less impairment of opposition of the thumb, and less difficulty in abduction of the thumb. There was, however, still inability to flex the terminal phalanges of thumb and index finger.

At the end of six weeks there was almost complete return of normal muscle power, the grip remaining somewhat weak. Sensation showed little improvement. For

three weeks after the healing of the wound a palmar splint and a sling were worn to ensure complete rest. Then massage and galvanism were started. Two months after the original injury trophic changes were noticed in the skin of the thumb, index, and middle fingers, consisting of an exfoliation of the outer layers of the skin. At the present time the skin of the affected fingers is perfectly normal.

On October 19th, 1921, comparative examination of the right and left upper limbs showed no difference in flexion of wrist, pronation of forearm, opposition and abduction of the thumb. There was a satisfactory grip, but still difficulty in the flexion of the terminal phalanx of index and, to a lesser extent, of that of the thumb. Deep sensibility was present all over the area of distribution of the median nerve. Epicritic and protopathic sensibilities were wanting only over the index finger.

To Dr. Chichester I wish to express my thanks for allowing me to publish this case.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

THE SCOPE OF SURGERY IN GENITO-URINARY TUBERCULOSIS.

In a leading article published on November 5th emphasis is laid on the generally accepted view that the only hope of dealing with a tuberculous lesion of the kidney is by nephrectomy. I have good reason for knowing that surgeons are impatient of even considering any other method, although at least one great authority states that renal tuberculosis almost always escapes detection during the period when a nephrectomy offers the greatest chance of success, and Bernstein and others do not hesitate to assert that great success has followed treatment by tuberculin injections.

The following case may not be without interest:

Captain D. consulted me in October, 1913, with a history of repeated attacks of haematuria. The first attack was in March, 1913, when it was accompanied with sharp, burning pain in the urethra and lumbar region. The blood disappeared in two days, leaving a dull pain in the left lumbar region. This pain had continued off and on ever since. His two uncles had died of phthisis, and he himself had had "consumption of the bowels" when a child. There was no history of syphilis, and an *x*-ray photograph of the lumbar region was negative. In April the urine had been most carefully examined elsewhere, the report being "All cultures sterile, no *Bacilli coli*, no tube casts, etc." Cystoscopic examination by specialists in London had shown a perfectly normal bladder and urethra, and the patient had been recommended to visit Contrexéville, as it was thought that his symptoms were the result of irritation by oxalate crystals. While at Contrexéville the pain began to radiate down the left leg, and as no relief was obtained he returned home and finally came under my care.

I found him highly nervous and complaining of much pain in the lumbar region and of frequent and painful urination. He looked pale and worn. The left testicle was atrophied, the result of an orchitis of nine years earlier. Von Pirquet's test was strongly positive. Accordingly, two days later, I gave him a further test with old tuberculin, when again the result was very positive, with both local and general reaction. On November 7th the bacteriological report by Dr. Galt of the Sussex County Hospital was received: "Tubercle bacilli plentiful and in clumps, many blood cells and few pus cells. No casts or *crystals*."

On November 11th injections of tuberculin were commenced with a dose of 1/50,000 mg. bacillary emulsion. There was a very slight local reaction. On November 20th a dose of 1/20,000 mg. was given; on the 24th, 1/10,000 mg.; on the 27th, 1/5,000 mg.; on December 1st, 1/2,500 mg.; on December 5th, 1/1,000 mg. By this time there was great general improvement, although there was complaint of "burning" over the region of the bladder, and some lumbar pain. The patient had put on no less than 7 lb. in weight. On December 9th, after a dose of 1/500 mg., there was considerable local reaction about thirty-six hours after the injection. No further dose was given until the 16th, when the dose of 1/500 mg. was repeated. On the 23rd, 1/500 mg. was again given; and the patient was now much improved. On the 27th, the dose was 1/120 mg., and the patient, although he still had some pain, expressed himself as feeling *very* much better. On January 15th the patient had gained 10½ lb. since treatment began.

The next five doses were all 1/150 mg., as there had been slight general reaction after the dose of 1/120 mg. This was followed by four doses, at about the same intervals, of 1/100 mg. There was no reaction after any of these doses. The patient was looking and feeling exceedingly well, with entire absence of pain and good appetite. By desire of the patient a specimen was now sent to Shorncliffe for examination by the army authorities, the report being: "Some pus cells, some renal epithelium, one clump of tubercle bacilli, fifteen in number." I then gave him, at intervals of about four days, four doses of 1/50 mg., after the first of which there was some local reaction only. On March 11th a report was received both from the army authorities and from the Brighton pathologist that the urine was quite normal. On March 13th he was given a dose of 1/25 mg., resulting in a very slight local reaction. This dose was continued at weekly intervals up to the middle of May. The patient's weight was now 11 st. 9 lb., or 21 lb. heavier than he had ever been in his life before. On March 29th the report from Shorncliffe was: "No tubercle bacilli, but some pus cells." On May 16th the largest and last dose of the course was given, 1/16 mg., and there was no reaction. The patient was now feeling exceedingly well, with perfect appetite and entire absence of pain, and on that date it was reported from Shorncliffe that they had found only a few tubercle bacilli beaded.

The patient was sent away for three months into the country, and on June 14th the Shorncliffe report was: "Tubercle bacilli very scanty, two only seen. Some pus cells." On July 19th report said: "No tubercle bacilli, few pus and renal epithelium cells." On September 4th Shorncliffe reported: "Tubercle bacilli *very scanty* and beaded." On September 13th the patient wrote that he was feeling quite well, had no pain of any sort, and was quite certain that he could easily go back to duty. On September 18th Dr. Galt reported: "No tubercle bacilli, no pus, blood, or crystals," and on the 29th, "No blood, pus, or casts, culture sterile, no tubercle bacilli," with note, "Urine seems to be quite normal."

The patient is still, I am informed, enjoying good health, and performing his usual army duties, and it seems to me that in this case, at any rate, the tuberculous lesion of the kidney *was* cured "otherwise than by nephrectomy."

Hove. A. H. Copeman, M.D.

ANAPHYLAXIS TO WASP VENOM.

G. W., aged 51, a farm labourer, who had always previously enjoyed good health, was stung on the ear on August 13th, 1921. He fainted after the sting, felt very ill, and had to be helped home. The ear became swollen and eczematous, and a few days later slight enlargement of the cervical glands occurred. Ten days subsequently a generalized urticaria appeared, which was followed in three days by acute general exfoliative dermatitis; this lasted for a fortnight, leaving him debilitated, and causing enlargement of the heart and accentuation of the pulmonary second sound.

He appears to have been sensitized by a wasp sting eight years ago; on that occasion he felt faint and suffered from local swelling round the site of the sting for a few days. All his life he has had a very great horror of wasps, although not at all afraid of bees.

A point of medico-legal interest in connexion with the case is that he successfully claimed sickness benefit under the Workmen's Compensation Act.

Cheltenham. J. Allman Powell, M.D.

OBSTRUCTED BREECH DELIVERY DUE TO HYDROCEPHALUS AND SPINA BIFIDA.

On October 19th, 1921, a multipara, aged 44, was confined of her ninth child. Her previous confinements had been apparently normal. One of us was in attendance, and on arrival found a breech presenting in the vagina. With a little trouble the feet were brought down, but no safe traction could produce further delivery. On the arrival of the other of us chloroform was administered, but for some minutes further traction was useless; a large head could be felt from the abdomen.

On further vaginal examination a tense "bag of fluid" could be felt high up on the dorsum of the foetus. The prospect of locked twins occurred to us, when further examination ruptured this "bag," and a large amount of serous fluid escaped. Now an irregular hollow, about 4 inches by 3, was apparent in the back of the fetus, and by traction on this and the feet the child was delivered.

The child was dead, and was full time; it had a large hydrocephalus, which apparently had collapsed and drained through the spinal opening; it was much deformed, the neck and several cervical vertebrae being undeveloped. The mother made an uninterrupted recovery.

A. J. Troughton, L.R.C.P. and S.Ed.,
J. F. Dow, M.D.Vict.

Bentham, Lancaster.

Reports of Societies.

TREATMENT OF PERSISTENT PAIN DUE TO NERVE LESIONS.

A discussion took place in the Section of Neurology of the Royal Society of Medicine, on November 10th, on the treatment of persistent pain due to lesions of the central and peripheral nervous system. Mr. Percy Sargent, President of the Section, was in the chair. The discussion was opened by Dr. Wilfred Harris, whose paper is printed in full this week at page 896.

Sir William Thorburn emphasized the extreme difficulty of judging of the results of treatment in painful affections. The treatment of symptoms, as apart from the treatment of lesions, was, of course, always a doubtful matter, especially if the symptoms were such as were almost impossible of description and quite impossible of exact measurement. It was very easy to be misled into thinking that the pain had been cured when actually the measures adopted had been of no value whatever. He instanced the procedure—now obsolete, he believed, but at one time supposed to have great efficacy—of stretching the sciatic nerve for the relief of lightning pains in locomotor ataxia. On the other hand, people who had long suffered from painful diseases had generally degenerated into such a mental condition that they would still imagine themselves to be suffering from recurring pain, especially if they had been for a long period under the influence of drugs, after the original painful cause had without question been removed. He went on to speak, in the first place, of conditions in which the actual objective of operation was most definite and certain, and those in which a lesion rather than a symptom was attacked. The cases in which the most clearly defined pain-producing lesion had to be dealt with were those due to pressure on the nerves. In these cases, and in traumatic affections of the nerves, there was, as a rule, a clear issue. If the source of pressure was removed the pain was cured, with, however, this proviso: there was a strong probability that in old-standing cases of pressure lesions, whether due to cervical ribs or other causes, there was ultimately produced a certain amount of neuritis with cicatricial changes within the nerve, so that in such cases where a neuritis had occurred, spreading beyond the original boundary of the pressure lesion, it was not to be expected that recovery would be invariably obtained.

With regard to injuries, the most typical examples were the end-bulbs found upon nerves after amputations. Here again it was important to take into account what might be called accessory pathological changes—changes inside the nerve—in the case of a nerve which had been long exposed. In the ordinary case of a painful stump the removal of the bulbs would be generally quite sufficient to produce cure of the pain, but not always; in a certain proportion of cases pain still persisted after a thorough removal of the bulb, and even after the excision of the nerves for a distance of a good many inches above the point where the bulb was formed. These were also cases in which the removal of the original source of the trouble might be followed by a progressive neuritis. Sometimes the pain extended so far that the most extensive resection was entirely unable to bring relief, and the only recourse appeared to be division of the posterior spinal nerve roots of the affected region. What could be done in the direction of preventing the nerve-bulbs? His experience went back to a day when, apart from war surgery, amputations were a good deal more common than now, and he considered that the one definite cause of end-bulbs of the nerves was sepsis, and that if the nerves were cut high up at the time of amputation, then even if—to speak after the old fashion—the wound should be septic, end-bulbs were not in the least degree likely. He himself had never adopted special measures, such as crushing, to obliterate the ends of cut nerves, and he was not aware of any amputation of his in which there had been trouble from end bulbs forming at a later date. The nerves had been cut short, and, of course, all the precautions had been taken to make the operation aseptic. Along with these conditions, cases of causalgia had to be considered. Here resection and suture did not invariably cure; out of twenty operations in Manchester sixteen only were cured, but he would like to know from those who had practised in war hospitals at home, where, unlike war hospitals abroad, there was opportunity to treat these cases, what treatment was found most useful. Another type of pain in connexion with traumatic injuries was painful cicatrix of the scalp following on a head injury, not necessarily of a severe nature, and often taking place a long while before the pain developed. Why scalp cicatrices should present this peculiar tendency to pain he did not know; possibly it was because the scalp, which was very mobile, was anchored to the immobile skull, and the constant traction on the intervening cicatrix caused pain.

Sir William Thorburn went on to deal with cases in which the issue was a little less clear, such as pains which probably arose in connexion with ganglia, spinal or cerebral, including trigeminal and other neuralgias and the localized tabetic pains. In trigeminal neuralgia he was in the habit of dividing the operations into two great classes, namely, those which did and those which did not imperil the eye. For himself he practically always adopted Schlösser's method, or, if that failed, the method of Jonathan Hutchinson, junr., which involved the removal only of the lower two-thirds of the ganglion, and had the merit of leaving the eye quite safe. With this method he had not found any recurrence. In post-herpetic neuralgia the cases were so few that it was difficult to make any generalization. He only knew from practical experience of two types which he need mention—the supraorbital type and the spinal type. He used to think that cases of the former type were ideal for alcohol injection into the supraorbital division, but he had been disappointed more lately in the results. Pain could be cured certainly temporarily by ablation of the nerve, but he had had no good results from alcohol injection. After speaking of tabetic pains and the good results to be expected from posterior rhizotomy, he said that there was a good deal of evidence that locomotor ataxia, like many other diseases of the spinal cord, was likely to be improved considerably by the mere operation of spinal drainage.

The most doubtful group of all was that which included the ordinary brachial neuralgias and so forth. Here he was not prepared to dogmatize as to any method of treatment. By the time they came to him the great majority of these cases had had a sufficiently prolonged experience of medicinal treatment, hydrotherapeutic and electrotherapeutic methods, and injections. He did not want to be regarded for a moment as despising any of these methods, which could all claim numbers of cures, just as a good many cases were cured under the influence of rest alone. But the cases he received were those in which these methods had been tried and had failed. He liked to expose the affected nerve, or as much of it as he could get, and such an exposure would, in a certain number of cases, indicate some source of pressure which would otherwise be overlooked, and in quite a large number of cases there would be found around the nerve adhesions to surrounding structures such as did not pertain to a normal nerve. At operation these things could be seen and dealt with. A neurolysis could be done if required, and probably this operation might be combined with a certain amount of nerve stretching. At any rate, to expose the whole length of the nerve was no more risky than to practise methods of injection and the like. Finally the speaker remarked on the large number of cases of so-called neuralgia which were talked about as rheumatic and so on, but were really due to intrathecal spinal tumours, which were liable to be overlooked for a long period, until perhaps it was too late. He was quite convinced that, if not in London, there were parts of the country where, through faulty diagnosis, one of the most curable diseases of the nerve system—an intrathecal tumour of the spinal canal—was frequently overlooked.

Dr. Gordon Holmes said that it was the teaching of English neurology that most diseases of the central nervous system which did not involve the meninges or extend to the posterior or other sensory roots ran a painless course. That that doctrine was true in the majority of cases there could be no doubt, but he was afraid it had been applied rather too widely. It was generally assumed that spinal diseases could produce pain only when the posterior roots were involved, but as a result of his war experience of gunshot injuries he thought it must be regarded as a possibility that a traumatic injury of the pain-conducting tracts within the spinal cord could

produce pain, persisting for several weeks at least. It was not so rare as it was generally assumed to be for intramedullary lesions of the cord to produce pain. Perhaps the most interesting point from the theoretical side concerned the manner in which these pains occurred. It was an old hypothesis that the lesion irritated the pain-conducting fibres, and therefore gave origin to the pain which was peripherally referred or projected. He did not think that many of them were willing to accept that explanation now. He had found in certain gunshot injuries of the spine that not merely painful or uncomfortable sensations were produced, but also an excessive sensation of what might be called pleasure on the affected parts of the body. The easiest working hypothesis in discussing the nature of central pain was to assume the view put forward years ago by Long, that the pain-conducting fibres throughout the central nervous system were represented by chains of neurons broken up repeatedly in masses of grey matter, and that the pain was due to some structural or dynamic change in portions of grey matter in which the pain-conducting fibres were normally interrupted.

Dr. S. A. KINNIER WILSON said that if it was the case that the tic movement of a tic douloureux disappeared when the neuralgia was relieved—whether it was a tic or spasm was for the moment immaterial—it seemed as though certain inveterate cases of torticollis might be treatable by the relief of the accompanying occipital neuralgia by operation on the posterior root ganglia. Torticollis was a very interesting subject, and often cases of torticollis were particularly untreatable. He also referred to the description in Dr. Harris's paper of certain patients whose pains came on only at certain times of day (for example, a woman who had the pains from 12 o'clock to 5 each day). These cases presented very interesting problems from a theoretical point of view. The view he himself took was that such cases were essentially psychogenic. He did not believe that any factor except one of that nature could produce the recurrence of pain over the same period of hours every day. He added that he had used ionization successfully in several cases of post-herpetic neuralgia when other forms of treatment had been unsuccessful.

The PRESIDENT said that his own experience of posterior root section had been extremely disappointing, and on very few occasions had it been worth doing; especially was this true of doubtful cases of persistent pain of causalgic character. Every kind of surgical treatment for the relief of these pains had been tried and all had had a measure of success, but on the whole there was more disappointment than otherwise. Unless the nerve could be dealt with at a high level and at an early stage there was little likelihood of any great result from alcohol injections, resection of the nerve, or anything of the kind, and after the pain had persisted for years, then the posterior section itself had very little influence.

Dr. WILFRED HARRIS, in replying to the point raised by Dr. Wilson as to the periodicity of the pain, would not subscribe to the opinion that the periodicity meant psychalgia. Periodic pain was familiar to many of them in other connexions. Moreover, the pain in this case had an anatomical distribution, and, contrary to the usual results in psychalgia, injection of the ganglion produced almost complete relief.

NEUROLOGICAL NOTES.

A MEETING of the Oxford Medical Society was held at the Ashurst Neurological Hospital on October 14th, with the President, Dr. E. MALLAM, in the chair. Drs. JOHNSON and RASHBROOK read the clinical notes and the pathological findings in a case of status epilepticus.

The patient had been regarded as suffering from an organic lesion, owing to the history of epilepsy, epigastric aurae, incontinence, and the fact that he had had an epileptiform seizure while alone in a house. The onset of the status epilepticus was quite sudden, and he died in a few hours, after a large number of fits, without regaining consciousness. *Post mortem*, there were found patchy thickening of the membranes of the brain, without any sign of injury, and a generalized fibrosis of the abdominal organs. The etiology of the condition was discussed by Drs. GIBSON and GOOD. Syphilis was regarded as the main factor, but in the absence of a Wassermann test or other positive indication, this must remain a supposition.

Dr. ADAMSON then opened a discussion on two early cases of general paralysis of the insane, with special reference to the importance of early signs. Among the points emphasized were:

(1) The care necessary in all cases in separating the organic from the functional nerve disorder, by consideration of the previous history and close attention to the physical signs, particularly irregularity of the pupil, alterations in reaction to light, convergence, and sympathetic stimulation; alterations in other reflexes with differences in reaction on the two sides; alterations in sensation and visceral symptoms, chiefly gastric pain and vomiting and retention of urine with loss of muscular power in the bladder. (2) There may be no mental symptoms in the prodromal stage, the superficial picture being that of neurasthenia, and where mental change does occur it may approximate to any type of mental disorder, ranging from change of disposition to dementia, and is determined in part by the localization of the disease, but chiefly by the previous psychology of the patient. (3) In the absence of sufficiently definite physical signs to warrant a clinical diagnosis, an examination of the cerebro-spinal fluid will differentiate between general paralysis of the insane, tabes, and cerebro-spinal syphilis.

Dr. SELBY-GREEN exhibited two cases showing signs of degeneration of the central nervous system.

In the first case the clinical examination suggested a parenchymatous lesion, whereas the improvement following treatment, and the result of the pathological examinations, were both in favour of an interstitial lesion. In the second case both the history and the clinical examination suggested a syphilitic pachymeningitis.

Dr. MCPHAIL'S remarks on a case of moral imbecility were illustrated by the application of the point-scale method of examination to the subject of his remarks. This patient was a stalwart-looking man who had served three and a half years in the army and showed little outward sign of defect. Dr. W. COLLIER commented on the importance of this demonstration, as probably few of the members present were competent to examine a mental defective, or had a lively conception of the issues involved. The evening closed with a short paper by Dr. RAE, entitled "From primitive to superman."

MEDICAL ASPECTS OF SEX LIFE.

A MEETING of the London Association of the Medical Women's Federation was held on November 15th at the Elizabeth Garrett Anderson Hospital, with the President, Dr. LOUISA MARTINDALE, in the chair. A discussion on "The physician's responsibility in respect of the sex life of the patient" was opened by Dr. Constance Long, Dr. Sylvia Payne, and Dr. Mary Bell.

Dr. CONSTANCE LONG said that parents often brought children to the physician with complaints about masturbation, or phases of lying or stealing, or other marks of a neurotic disposition. These characteristics formed a well known syndrome, originating in some psychic disturbance. In dealing with such a case she suggested that tactful inquiry should be made about the emotional atmosphere of the home. Investigation usually revealed some disharmony between the parents, and it was sometimes necessary to probe into the personal life of the forbears to obtain such an enlightened view as would secure an improved emotional environment for the child. She advised that older children should never be allowed to share their parents' bedroom. In regard to the significance of masturbation in children, Dr. Long defined this habit as "self-generated eroticism," and pointed out that it might arise from fantasy alone, without any friction, or from the contemplation of some representative object. The masturbation of puberty and adolescence was connected with tension, both physical and psychical. At such a time, when the sex organs were developing fast, masturbation might be physiological and act as a safety valve. Masturbation should not be punished; it would disappear with maturity—if the life were normal. Dr. Long thought that medical students should have more definite teaching on the subject of sex relations before they encountered such problems in practice. Patients who asked advice on the subject of the frequency of coitus should be told that the mutual happiness and well-being of the two partners should be their guide.

Dr. SYLVIA PAYNE said that the history of primitive races showed that the present-day attitude to sexual problems was largely the outcome of ancient taboos and customs. The advance in psycho-analytical investigation showed that the psychical side of sexuality was as important as the purely physical. Medical women in general practice were continually consulted by newly married women for dyspareunia. If no physical defect were found, the difficulty was usually due to ignorance or fear, and the treatment was psychical rather than gynaecological, combined with a few practical hints. The speaker then dealt

with the relation of self-control to repression, repression being primarily an unconscious process, while self-control was a conscious function associated with volition. In married life mutual understanding was the basis of self-control, and newly married people should be advised to discuss these matters freely together.

Discussion on the subject of the papers was carried on by Dr. MARY BELL, Lady BARRETT, Dr. HELEN BOYLE, Dr. MARY GORDON, and others.

MEETINGS of the Leeds and West Riding Medico-Chirurgical Society were held on October 28th and November 11th. At the former meeting, amongst numerous specimens and cases exhibited by members, Dr. MAXWELL TELLING and Sir BERKELEY MOYNIHAN showed a patient suffering from long-standing acholuric jaundice in whom splenectomy had been performed. Dr. MAXWELL TELLING read a paper entitled, "Psychotherapy, with and without specialism," which was followed by an animated discussion. The meeting on November 11th was held in the afternoon, at the Leeds General Infirmary, when operations were performed and cases demonstrated by members of the honorary staff. This type of meeting was a new departure, undertaken at the request of a number of members, and attracted a moderate attendance.

Reviews.

KEEN'S SURGERY.

KEEN'S *Surgery*,[1] both in its material and style of production, is established as a masterpiece among modern encyclopaedic medical works. The first six volumes recorded the progress of surgery up to 1913. Two supplementary volumes (VII and VIII) have been recently published; they contain chapters which are in the nature of appendices to the original work, and also a good proportion of fresh matter which owes its origin to surgical experiences in the great war. As in the earlier series, a large number of contributors have been called upon to assist in the compilation. Of these, seventy in number, most are American, but some well-known English authorities have written chapters on subjects associated with their name during the war.

Volume VII is chiefly concerned with war surgery, no fewer than fifteen of its chapters being devoted to this subject. The reader of the present day has perhaps had his fill of publications on these matters, but it must be said that this volume provides an excellent review and a good bibliography of the wide field of work coming under this category. Chapters on the Administration of the American Military and Naval Services are of no little interest. They reveal the thoroughness of the American medical organization in the late stages of the war; the Englishman may well be envious when he reads that on the medical staff of every division in the field, in addition to the ordinary establishment, there was an orthopaedist, a psychiatrist, and a urologist, to say nothing of a divisional sanitary inspector in charge of a mobile laboratory. Some measure of the detail considered necessary by the naval service may be gauged from the fact that every fighting ship was equipped with an embalming outfit and sealable caskets.

In the chapter on the technique of wound treatment the author strongly extols the Carrel-Dakin methods. In general, he evinces a greater faith in the specialized methods of treatment than would be shared by many who have experienced their serial development, though it is fair to add that he gives full attention to the subject of wound-excision or "*débridement*." The article on gas gangrene by Sir Cuthbert Wallace includes some beautifully executed colour illustrations reproduced from drawings and microphotographs. The subject of gunshot fractures is dealt with very fully by Dr. Blake, and the chapter contains a great deal that should be suggestive and helpful in civil work. Three chapters are devoted to wounds of the nervous system, Sir William Thorburn being responsible for those on injuries of the spine and peripheral nerves. The latter chapter sets forth present knowledge of the subject very clearly and is accompanied by a full bibliography.

The military surgery of joints is, perhaps, mainly of interest on account of the detailed consideration of Willums' method of treating suppurative arthritis by early active mobilization. The author is strongly in favour of the procedure and does not appear to attach much importance to the fixation of joints during certain periods of treatment.

The very exceptional experience gained in blood transfusion and in the handling of traumatic shock during the war is fully related, and the chapters on both subjects contain a wealth of details which have a direct application to civil practice. It is of interest to note that Dr. Lee is opposed to the use of gum acacia solution, and relates several fatalities attributed to its use. He considers that the citrated method of blood transfusion established itself as the method of choice for field service work. A well illustrated chapter on the military surgery of the vascular system is contributed by Dr. Matas; in it he considers fully both the immediate and late treatment of injuries of the heart and large vessels.

Among the chapters constituting supplements to earlier publications may be noted that on rabies, which contains recent statistics of the incidence of the disease. Under the surgery of the skin a full account is given of the treatment of burns by means of a hard paraffin dressing. The treatment of syphilis, especially by means of arsphenamine, is brought up to date, and a careful analysis of the reactive symptoms after its administration is given. Orthopaedic surgery in civil life is dealt with by Dr. Lovett. Descriptions of Soutter's operation for flexed hip and Ober's operation for talipes equino-varus are included. The reproduction of skiagrams illustrating the bone condition in rickets are perhaps the least satisfactory of the figures in this volume.

Volume VIII contains forty chapters, most of which are in the nature of supplements detailing the most recent advances in civil surgery. At the same time, many of them are coloured by war experiences. This has involved a certain amount of overlap in the subject matter, but perhaps not more than was inevitable in a work to which there were so many contributors. The article on the surgery of the thyroid is by Charles Mayo, and for its clear comprehension a reference to the previous chapters on the subject is necessary. Two further chapters are devoted to pathological questions concerning goitre. A well illustrated article by Adson deals with the surgery of the hypophysis.

The surgery of bone disease is treated at some length by Warbasse. He is very insistent on the importance of the prompt diagnosis of acute osteomyelitis, and optimistic in regard to the results of a limited operation in cases treated early. His confidence in the possibilities of osteoplastic surgery might well mislead the inexperienced surgeon; and his statement, "Wherever bony tissue is missing it may be supplied from other sources," must clearly not be taken too literally. Under the surgery of the head, gunshot wounds are dealt with in detail, and the recent surgery of hydrocephalus receives full notice.

A French contributor, Darcissac, is responsible for the chapter entitled "The rôle of the dental surgeon in the treatment of fractures of the jaws." It is concerned largely with the grosser deformities and defects only likely to be met with under war conditions, but the methods applicable to civil practice are also clearly described and figured.

As might be expected, the treatment of the surgery of the thorax is largely based on war experience, but the methods put forward for treating pulmonary tuberculosis surgically are considered closely, and some interesting statistical information of the after-results of these procedures is provided.

There is an excellent series of articles on abdominal surgery, introduced by a short chapter from Crile, in which he emphasizes the importance of avoiding shock by the use of local and nitrous-oxide anaesthesia. The supplement to the late John B. Murphy's article on appendicitis is written by Deaver and Pfeiffer. Although it cannot be said to contain any very obviously new material it should be of great interest to every practical surgeon on account of the carefully reasoned and suggestive advice given as to the time and methods of operation in the later stages of the acute disease. The authors clearly

[1] *Surgery: Its Principles and Practice.* By various authors. Edited by William Williams Keen, M.D., LL.D. Vols. vii and viii. Philadelphia and London: W. B. Saunders Co. 1921. (Roy. 8vo, vol. vii, pp. 855, 359 figures: vol. viii, pp. 960, 657 figures; Index, pp. 182. Cloth, £6 6s.; half morocco, £7 15s., the two volumes, including Index.)

recognize that there are cases which have a better chance of survival if the surgeon holds his hand for a while, and are also very clear upon the evil effects produced by the administration of purgatives at any stage of the disease. The surgery of the gall bladder and bile ducts is discussed by W. J. Mayo and Balfour. It is noticeable that they strongly favour cholecystectomy as opposed to cholecystostomy for most morbid conditions of the gall bladder. One of the best chapters in this volume is that on the surgery of the prostate; it is by Young, and its eighty pages are full of fresh material that has not yet found its way into the textbooks.

There are several chapters on matters which are not usually classified as surgical, but which are none the less of close interest to the surgeon, such as, for instance, renal deficiency tests, physiotherapy, the technique of radium, of *x* rays, and of electro-desiccation. There is an excellent chapter on pathological blood and serum examination which might be entitled "What every surgeon ought to know about clinical pathology." The volume ends with sections on poison gas, the legal relations of the surgeon, the American Red Cross, and a note by the general editor on a practical method of dressing an artificial anus.

The production of the supplementary volumes, both as regards press and illustrations, maintains the high standard set by the original work.

HEART DISEASE AND PREGNANCY.

The main object with which Sir James Mackenzie has written his book on *Heart Disease and Pregnancy*[2] is to direct the attention of those in charge of pregnant women to the more recent views concerning the heart and its powers. The chapters appeared originally as articles in the numbers of the *Lancet* last June. In the book thus formed we find a short and concise expression of the author's views on heart disease, special emphasis being laid on the bearing of abnormal heart conditions on pregnancy and labour. Those who are familiar with Sir James Mackenzie's writing will recognize that this book is largely a restatement of his views on heart disease, applied in the most helpful way for the guidance of those who have to deal with pregnant women.

The first three chapters are devoted to the changes in the heart and circulation during pregnancy, labour, and the puerperium. As the author points out, the feature that is dreaded in cardiac patients is the appearance of heart failure. Its significance is discussed and the earliest indications of a failing heart are dealt with in detail. This, in fact, is the keynote of the book, for in dealing with pregnant women who are suffering from heart disease the one thing that matters is that the medical attendant should understand and be able to recognize the earliest manifestations of a failing heart.

The different forms of valvular disease are discussed, and the bearing of each on pregnancy is carefully considered. Certain physical signs and symptoms have in the past caused difficulty; they belong mainly to three groups: (1) Murmurs; (2) irregular action; and (3) cardiac pain. No practitioner can hope to deal intelligently with a patient presenting one or more of these three classes of symptoms unless his knowledge is sufficient to enable him to assess accurately the significance of each abnormal manifestation.

Of the various arrhythmias, auricular fibrillation is of paramount importance, and may be looked upon as an absolute bar to pregnancy, and if pregnancy has occurred in the presence of fibrillation it may be necessary to induce premature labour. With our present knowledge, the ability to differentiate between fibrillation, sinus arrhythmia, and the irregularity due to premature beats, is called for even in an obstetrician. When the assessment of the value of many of these abnormal signs comes to be discussed stress is laid upon the importance of judging the power of the heart to meet pregnancy, by its response to effort. In other words, what must be assessed is the power of the myocardium. If the heart is normal in size and the response to effort good, then little or no attention need be paid either to a murmur, the occurrence of premature beats, or to the cardiac pain associated with the excitable heart of a neurotic woman. The chapter on mitral stenosis is one of great practical value.

Although the subject of this treatise is heart disease and pregnancy it is a book which will be read with great profit by every practitioner. It is full of sound advice and helpful statements with regard to the capacity of the heart to meet the stress and strain of life, irrespective to pregnancy, though pregnancy and labour do of necessity add a load to that which the heart normally carries. Sir James Mackenzie has given us helpful guidance as to the principles on which to assess the capacity of the heart to meet these peculiar handicaps.

[2] *Heart Disease and Pregnancy.* By Sir James Mackenzie, M.D., F.R.C.P., LL.D.Edin. and Aberd., F.R.S. Oxford Medical Publications. London: H. Frowde, and Hodder and Stoughton. 1921. (Demy 8vo, pp. 152; 21 figures. 8s. 6d. net.)

THE INTESTINAL PROTOZOA OF MAN.

The Intestinal Protozoa of Man, by Dobell and O'Connor,[3] forms a useful addition to the work on the amoebae living in man published by Mr. Clifford Dobell some little time ago. In the preface Mr. Dobell explains the scope of the new book, and also says why it was written. "It appeared to the present authors that such a book—touching upon the two fields of zoology and medicine—ought to be written jointly by a zoologist and a medical man: for by such collaboration many mistakes, due to the limited knowledge of either, might obviously be avoided." Unfortunately, Dr. O'Connor had to go abroad on a scientific expedition, and the completion of the work therefore devolved on Mr. Dobell himself; in consequence, the book as it now appears is different in many ways from what was originally planned. Many of the chapters are from the pen of Mr. Dobell alone: these include the introduction, the section dealing with the coprozoic organisms, the lists of synonyms, and keys for the determination of genera and species; all discussions of systematics and classifications, the references at the end of the volume, and the general bibliographic work throughout. The aim has been, while giving close attention to accuracy, to be as brief as possible, and so to produce a practical handbook helpful for the beginner and at the same time of value to the serious student in the prosecution of his studies. A point also attended to has been the compilation of full and accurate references.

The contents of the book are contained in nine chapters as follows: I, Introduction: the intestinal protozoa of man. II, The intestinal amoebae of man. III, Amoebiasis. IV, The intestinal flagellates of man: "Flagellosis." V, The intestinal coccidia of man: Coccidiosis. VI, The intestinal ciliates of man: Balantidiosis. VII, The diagnosis of intestinal protozoal infections. VIII, The treatment of intestinal protozoal infections. IX, The coprozoic protozoa of human faeces. In addition there are the references, an index, and eight plates—one a frontispiece, and seven at the end of the volume.

The intestinal amoebae of man have been dealt with, as we have said, in a separate work by Dobell—a work which has crystallized knowledge of these parasites and brought harmony into what was previously chaos; it is not necessary to linger over the part of the present book in which this subject is dealt with therefore. The remaining chapters are written with the accuracy and minute care that characterizes all Mr. Dobell's work, and students of the subject will find in them much pabulum for careful study. The scientific part needs no criticism from us; it is excellent in every way, and should form a standard for such work in the future. All the recent work on treatment also is suitably recorded. The references are full, and will prove of the very greatest value to workers on the subject, while the plates are beautifully executed and are as near perfection as anything can be. We have said enough, then, to show that this is a valuable book which doubtless will be recognized as a standard work on the subject for many a day to come. All that remains is to congratulate the authors on their success, and heartily to recommend the work to protozoologists and medical practitioners alike.

[3] *The Intestinal Protozoa of Man.* By Clifford Dobell, M.A., F.R.S., and F. W. O'Connor, M.R.C.S., L.R.C.P., D.T.M. and H. London; Published for the Medical Research Council by John Bale, Sons and Danielsson, Ltd. 1921. (Roy. 8vo, pp. 218; 8 plates, 1 figure. 15s. net.)

VETERINARY HYGIENE.

THE need for a trained and scientific veterinary service was brought home to the people of this country in the latter part of the last century by costly and bitter experience. The outbreak of cattle plague, or rinderpest as it was called, in 1865 threatened to destroy the entire stock of cattle in England. A disaster so appalling was prevented by organized and systematic effort; and a few years later, in 1869, the Contagious Diseases (Animals) Act was passed and regulations made under that and subsequent measures of a similar character have over and over again prevented the spread of disease among animals. Many of these regulations demonstrate the importance of preventive veterinary medicine, so that hygiene has become a necessary part of the curriculum of the veterinary student, for whom Professor R. G. LINTON'S *Veterinary Hygiene*[4] is a most trustworthy and complete textbook. It is divi ed into seven sections dealing respectively with water, meteorology, sanitation, air and ventilation, building construction, preventive medicine, and sanitary law. In the section on sanitation the plan has been adopted of describing and picturing good and bad types of appliances such as drain traps. We wish the teaching of the author on the disposal of manure could be instilled in every British farmer and especially every dairy farmer; we might then be on the high road to producing clean milk. Solid manure, he says, should be taken out of stables and cowsheds and removed as far away as possible at least twice daily and from piggeries once daily. The liquid manure should be drained to a distant settling tank, and both should be conserved and put on the land instead of, as is too often the case, left to soak into the fold yard in close proximity to a dairy or dwelling house.

In the section on building construction only fifteen lines are given to a description of manure pits, and the importance of having them so constructed that they can be completely emptied is not emphasized. To this end a most useful arrangement is the wire front to the manure receptacle, which used to be so commonly seen in the old London mews. Equally good is the custom to be met with in some country districts of dispensing with a manure receptacle or pit altogether and throwing the manure directly into a cart; by this means also labour is saved. The flooring recommended for piggeries is cement. We should like to have found an opinion on the Chinese pigstyes as described by Dr. Reginald Farrar in a report to the Local Government Board in 1911; the boarded floor of these styes is about 18 inches above ground level, and beneath it is a large cesspit receiving the liquid excrement; the boards in the part of the pen in which the animals lie are always dry and clean; the solid manure, which is collected daily, being deposited in one corner, or at any rate on one side of the pen. "I was told," wrote Dr. Farrar, "that the pigs were readily trained in this habit, any animal transgressing being corrected with a bamboo."

In the section on ventilation it is properly assumed that buildings in which animals are housed are not on the same footing as human habitations; what is required of them is that they should protect from rain, driving wind, and excessive cold and damp, and should provide facility for feeding and attendance. Several forms of natural ventilation are clearly and accurately described, and their advantages and disadvantages discussed. Ridge ventilation finds most favour with the author. On the question of the tuberculin test as applied to dairy herds he does not express very decided views; he would seem to be in agreement with McFadyean that although the ordinary subcutaneous test with tuberculin cannot be relied upon to provoke a distinct temperature reaction in every infected animal, yet there is good reason to believe that when combined with the ophthalmic and intradermic methods the failures can be reduced to vanishing point.

[4] *Veterinary Hygiene.* By R. G. Linton, M.R.C.V.S., Professor of Hygiene, Royal (Dick) Veterinary College, Edinburgh. The Edinburgh Veterinary Series. Edinburgh: W. Green and Son, Ltd. 1921. Roy. 8vo, pp. 429 + xiv; 92 figures. 26s. net.)

PHYSIOLOGY.

PHYSIOLOGY during this century has become more and more a matter of physics and chemistry, a tendency that is found crystallized into a perfect form in the *Principles of General Physiology*, published a few years ago by Professor Bayliss. Mr. BURNS'S *Introduction to Biophysics*[5] is a textbook showing how the laws of physics and chemistry may be applied to the fluids, cells, tissues, and systems of the body, and to the body considered as a whole. The book is well written and illustrated; it is not an examination book, but should be of great interest to students of physiology and biology, as well as to the reader of general science.

Professor ROAF'S *Biological Chemistry*[6] is a book for biochemists, and perhaps also for the intelligent general reader or professional man who has something more than a nodding acquaintance with chemistry and chemical physics and wants to know more about biochemistry or the chemical processes of living matter. The subject inevitably makes somewhat stiff reading, and Professor Roaf's exposition of it is thorough and condensed, full of facts, well written, amply documented, and adequately illustrated. It is divided into three parts: The first gives the essentials of organic chemistry and physics as applied to biochemical study. The second deals with the anabolic activities of living matter, or the utilization of the sun's radiant energy in the formation of carbohydrate, fat, protein, pigment, and the like. The third part of the volume describes the catabolic processes of cells and organisms, nutrition, respiration, and excretion; the last chapter gives an account of the action of microbes. The subject of biological chemistry, as has been implied above, is constantly increasing in importance, and Professor Roaf's short textbook should be in the hands of all who are interested in its progress.

The medical student has a large and increasing number of textbooks to help him in the study of physiology and to direct his practical work in the physiological laboratory —a true embarrassment of riches, should he ever become aware of the fact. Professor BURTON-OPITZ of Columbia University has contributed two volumes to the stock from which he may draw—a *Textbook of Physiology*[7] and *Advanced Lessons in Practical Physiology*.[8] In the preface to the first of these the author upholds the contention that "medicine is physiology," and the book is admirably adapted to put before the student the medical aspects of physiology, so that in the wards he may realize the fact that at every turn he is confronted by processes of normal or abnormal physiological activity. The chemical side of physiology receives comparatively little attention in the book, and the same may be said of the physics of physiology. An attractive feature of the volume is the skill with which the author introduces discussions on such subjects as anaphylaxis, ametropia, ventilation, fever, and parturition, that do not usually find a place in physiological textbooks. We have nothing but praise for their insertion, for they serve to bridge the chasm between theory and practice that often marks the passage of the medical student as he goes on from his preliminary studies to the hospital, and prevents his return. The laboratory handbook on *Practical Physiology* consists of sixty lessons or chapters which seem to cover the ground very adequately. Professor Burton-Opitz contemplates the use of fairly simple apparatus throughout these lessons; at the end of the book he provides a summary list of thirty demonstrations, to be given in conjunction with them, in which more complicated apparatus is used or experiments are attempted. Both these books may be recommended to students and teachers of physiology who desire volumes designed and executed on rather unusual lines.

Professor BUCKMASTER'S *Course of Practical Physiology*[9] is based on his methods of teaching at University College, London, and serves to introduce students of physiology

[5] *An Introduction to Biophysics.* By D. Burns, M.A., D.Sc., with a foreword by D. Noël Paton, M.D., LL.D., F.R.S. London: J. and A. Churchill. 1921. (Roy. 8vo, pp. 415; 85 figures. 21s. net.)

[6] *Biological Chemistry.* By H. E. Roaf, M.D., D.Sc., M.R.C.S., L.R.C.P. London: Methuen and Co. 1921. (Cr. 8vo, pp. 232; 46 figures. 10s. 6d. net.)

[7] *A Textbook of Physiology for Students and Practitioners of Medicine.* By R. Burton-Opitz, S.M., M.D., Ph.D. (Roy. 8vo, pp. 1185; 644 illustrations, 63 in colours. 32s. 6d. net.)

[8] *Advanced Lessons in Practical Physiology for Students of Medicine.* By R. Burton-Opitz. Philadelphia and London: W. B. Saunders Co. 1920. (Roy. 8vo, pp. 238; 123 figures. 18s. net.)

[9] *A Course of Practical Physiology introductory to Physiology and Medicine.* By J. A. Buckmaster, M.A., D.M.Oxon., and H. R. B. Hickman, M.A., M.B., B.Ch.Oxon. Bristol: J. Wright and Sons, Ltd.; London: Simpkin, Marshall, Hamilton, Kent, and Co. 1920. (Cr. 8vo, pp. 144. 5s. net.)

and students of medicine to their practical work in physiology. It is divided into three parts, the first of which is given to elementary work, and contains thirteen sections; the second part describes the advanced course; and the third part details a few chemical methods of proved utility. Professor Buckmaster wisely contents himself with brief but adequate descriptions of what the student is to do, without diagrams or figures to short-circuit his intelligence. Most of the experiments make use of the human being as object, a minority only employing the frog; as a result the medical student will find a great deal of his experimental knowledge directly applicable to his work in the wards. The book is admirable, clearly written, and may be strongly recommended to teachers of practical physiology as well as to their pupils.

The short handbook of chemical physiology, by Professor Schmitz,[10] of Breslau, consists of a series of chapters in which the chemical processes of the body are considered. The matter is in the main treated from the physiological point of view, stress being laid on the processes and methods whereby the chemical substances of the living organism are built up or broken down rather than on the chemical bodies concerned therein. Many references to the German literature of the subject are given, and the book may on that account be useful to British teachers.

DISEASES OF THE NOSE AND THROAT.

The first edition of the book on *Diseases of the Nose and Throat*,[11] by Parker and Colledge, appeared in 1906, and in the second edition, which has just been published, the opportunity has been taken of rewriting some portions and omitting others, the considerable lapse of time having modified knowledge of the subject and settled many debated points. The purpose of the book is to assist post-graduate students, particularly those attending special courses of study in diseases of the nose and throat, and to them and to practitioners who wish to keep abreast of the subject the book may certainly be commended. What faults it has are minor ones. In regard to the illustrations, for instance, the authors are undoubtedly right in recognizing that it is a fallacy that photographs make better medical illustrations than drawings; the photographs are few, and many of the illustrations are the excellent drawings from Morell Mackenzie's classical work. In some cases, however, neither the illustrations, though numerous, nor the subjects most requiring illustration are well selected from the point of view of the post-graduate student. For example, although Whillis's method of tonsil enucleation is well and adequately shown, submucous resection of the nasal septum and other operations are illustrated only by pictures of instruments. While it is an excellent idea to emphasize in one of the six sections of the book, as the authors do, the relation which diseases of the upper respiratory tract have to general medicine, this section has had a bad effect upon the orderliness of the volume. Diseases of the larynx, for instance, appear in one section, but syphilis and tuberculosis of the larynx in another. It would have been better for the authors to have made up their minds whether they preferred an anatomical or a pathological arrangement, and had had merely a chapter in the introductory section on the relation of the subject to general medicine. After all, however, these points do not greatly affect the real value of the book, and they are compensated by an unusually good index.

Dr. Douglas Guthrie's little book, *Diseases of the Ear, Nose and Throat in Childhood*,[12] accomplishes admirably what it sets out to do. It is intended to meet the demand for a concise, practical account of the diseases of the ear, nose and throat in early life, especially by general practitioners and school medical inspectors. It does not pretend to be an exhaustive treatise on oto-rhino-laryngology. The author emphasizes chiefly those matters which are of most value from the practical point of view, such as the technique of syringing the ear, the treatment of suppurative otitis, the introduction of nasal packing, and the operation of tonsillectomy, and his clear opinions—which do not depart from the orthodox teaching of the day—and descriptions are excellently illustrated by black and white drawings. The book can be recommended to the general practitioner and the school medical officer, and it is well calculated to stimulate an interest in the more intensive study of oto-laryngology.

[10] *Kurzel Lehrbuch der chemischen Physiologie.* Von Dr. E. Schmitz. Berlin: S. Karger. 1921. (Roy. 8vo, pp. 334 + v. M. 88; Geb. M. 104.)

[11] *A Guide to Diseases of the Nose and Throat and their Treatment.* By C. A. Parker, F.R.C.S.Edin., and L. Colledge, M.B., F.R.C.S. London: E. Arnold. 1921. (Demy 8vo, pp. xv + 583; 241 figures. 25s. net.)

[12] *Diseases of the Ear, Nose and Throat in Childhood.* By Douglas Guthrie, M.D., F.R.C.S. The Edinburgh Medical Series. London: A. and C. Black, Ltd. 1921. (Cr. 8vo, pp. viii + 88; 30 figures. 5s. net.)

NOTES ON BOOKS.

We have received a copy of the second edition of Mr. J. A. Crowther's *Manual of Physics*,[13] an excellent text-book for elementary students. The first edition was reviewed in the British Medical Journal of November 8th, 1919, page 600.

Professor Bosellini's book on dermatology in relation to internal medicine[14] is designed for the instruction of students and practitioners of medicine; it begins with full accounts of the anatomy and physiology of the skin. Then follow chapters on the changes produced in it by such things as circulatory disorders, inflammation and disorders of nutrition. The greater part of the volume is devoted to the effects of the organopathies on the skin, that is to say, the cutaneous manifestations in diseases of the sympathetic nervous system, ductless glands, digestive organs, and so forth. Professor Bosellini has a facile pen, and has collected a great deal of general and theoretical information for his volume; one may read many pages without encountering a single serviceable fact, however much the fancy or interest may be stimulated; the subject of treatment does not appear to be considered at all. The book may be recommended to medical readers with philosophic minds.

Professor Centanni's treatise on immunology[15] presents the student and practitioner of medicine with a general and somewhat scrappy account of the subject, developed largely on the lines of Ehrlich's side-chain theory that now suffers from a certain disrepute among pathologists and chemists alike. The author describes immunity as of three varieties: first, antigenic, that produced by vaccines and serums; second, histogenic, that due to the cells and tissues of the body; and third, stomogenic (Centanni, 1919), a variety not readily intelligible but concerned with protein-therapy, and due to substances termed stomosins that are the products of the breaking down of proteins. Professor Centanni has been an active worker in the field of immunology for thirty years, and his book contains a full exposition of the views he holds on many disputed points of theory; it may be recommended to the discriminating reader.

The fourth edition of Dr. Heitzmann's *Urinary Analysis and Diagnosis*[16] is divided into two main parts. The first of these gives an account of the chemical examination of the urine, old-fashioned, somewhat rough and ready. The second part, forming the bulk of the volume, is devoted to the microscopical examination of the urine, and is illustrated by a large number of plates drawn by the author from material coming under his own observation. Dr. Heitzmann holds strong views as to the possibilities of urinary diagnosis, to which others, perhaps, will not fully subscribe. The book is conscientious, but not always convincing.

As its title implies, an unpretentious yet most comprehensive little cookery book has been produced by Miss Mabel Baker under the title of *Cookery Simplified*.[17] In addition to more elaborate recipes, those for everyday necessities, such as the correct way in which to make tea and coffee and to cook eggs and potatoes, are included. Useful hints on cleaning utensils and cooking by gas, etc., are also supplied.

[13] *A Manual of Physics.* By J. A. Crowther, Sc.D., F.Inst.P. Second edition. Oxford Medical Publications. London: H. Frowde, Hodder and Stoughton. 1921. Cr. 8vo, pp. 559; 295 figures. 16s. net.)

[14] *La Dermatologia nei suoi rapporti con la Medicina Interna.* By Professor P. L. Bosellini. Milan: Società Editrice Libraria. 1921. (Roy. 8vo, pp. 616. 16 figures.)

[15] *Trattato di Immunologia.* E. Centanni. Milano: Societa Editrice Libraria. 1921. (Roy. 8vo, pp. 3:8. 61 figures.)

[16] *Urinary Analysis and Diagnosis by Microscopical and Chemical Examination.* By L. Heitzmann, M.D., New York. Fourth revised and enlarged edition. London: Baillière, Tindall, and Cox. 1921. (Roy. 8vo, pp. 384; 131 figures. 22s. 6d.)

[17] *Cookery Simplified.* By M. Baker. Bristol: J. W. Arrowsmith, Ltd.; London: Simpkin, Marshall, Hamilton, Kent, and Co., Ltd. 1921. (Cr. 8vo. pp. 146. 2s. 6d. net.)

British Medical Journal.

SATURDAY, NOVEMBER 26TH, 1921.

PUBLIC HEALTH AND PRIVATE PRACTICE.

A LEAFLET has been issued by the Willesden Urban District Council concerning the charges for medical services which it decided to institute as from October 1st, 1921. By the payment of a registration fee of 2s. 6d. for each person there will, it states, be available for all mothers, and children under 5 years, resident in Willesden, and for children attending Willesden public elementary schools, out-patient medical and dental care, including specialist consultations, prescriptions, home nursing, and the benefit of the eye, throat, nose and ear, mothers', babies', and other clinics. Additional benefits are also available, including the provision of artificial teeth and surgical instruments at cost price and of spectacles at a fixed price of half a crown. Under the same heading of additional benefits comes in-patient treatment at the Municipal Hospital—the infectious diseases hospital, in fact. Confinement cases at this hospital are charged an inclusive fee of £2; the operative treatment of tonsils and adenoids is carried out for 7s. 6d.; diseases of women are treated for 3s. a day, and diseases of children (up to school-leaving age) for 1s. 6d. a day. In the case of patients whose circumstances are below the council's scale the whole of these charges, except the registration fee, may be remitted.

It is with a somewhat startled interest that the general medical practitioner must contemplate not only this scale of charges, but the whole policy of the council which underlies it, for no one can foretell whither it may lead. The Willesden Division of the British Medical Association is well aware of the significance of the matter; its last meeting, at which this policy was thoroughly considered and important resolutions were adopted, is fully reported in this week's SUPPLEMENT.

The activities of the public health service, curative as well as preventive—medical skill being supported by a staff of nurses and health visitors—are, of course, a benefit to the poorer classes of our population, where such functions can be carried out adequately. To people who can afford to pay for such services, however, the curative help of the public health official seems unnecessary and superfluous, and the burden it adds to the ratepayer is obvious. The sick person, we believe, prefers the care of a private practitioner and a private nurse to that of officials, however competent. In the regulations of the Willesden Council no restrictions as to income are to be found, and it is evident that the whole of its benefits are intended to be open to all of the inhabitants who come within its scope, without restriction. If, then, the "out-patient" care of mothers, with dental treatment and attendance upon confinements and diseases of women, the provision of specialists and nurses, and the care of all children under five years and of those who attend elementary schools—including ophthalmic and dental treatment, as well as the operative treatment of adenoids—is to be provided by the municipality, little remains to be done by the private practitioner in the average type of general medical practice. In other words, the most important work in the ordinary urban practice has gone.

If this work—no light burden—undertaken by a municipality, were to be better done, both from the individual and from the public point of view, by the public health service than by the general practitioner, general practice of this type would be undermined, and perhaps rightly so. But will it be better done? For the answer to that question reference must first be made, in the case of Willesden, to the last annual report (1920) of the medical officer of health of that borough. In regard to the study of preventive medicine, "every member of the medical staff of the authority having more routine work than he or she can reasonably perform, it is impossible to give the necessary attention to subjects of the kind I have mentioned" (p. 14). These subjects include, for example, "the study and application of measures for prevention which should proceed *pari passu* with treatment," and "the need for an intensive study of the physical condition of the child, in relation to school and home." With reference to the treatment of infectious diseases, it is stated on p. 28 that "it has been again impossible to admit to hospital all cases of scarlet fever desiring removal. Hospital removal for scarlet fever had to be curtailed in October, 1920, after which time only the more urgent cases were removed. . . . These were not all removed as soon as notified, but as and when beds were available." Again, on p. 85, we find: "The [municipal] hospital really has never had adequate accommodation since I [the superintendent] entered your service, even during the years it remained an isolation hospital purely. . . . A year ago I pointed out that the nursing staff was insufficient and it was not possible for the required amount of treatment to be carried out without imposing great hardship on your nurses. . . . The sickness rate amongst nurses has been very high." Moreover, "No hospital that I can learn of can show such a record as this, where with only 199 beds, 2,608 patients (be it noted infectious and non-infectious cases) are admitted, and yet with only two resident medical officers. . . . It is not possible for them to get adequate relief."

Yet, with this overwork of both nursing and medical staff, 1,495 non-infectious cases were admitted during the year; of these 470 were maternity cases, of which but 72 are noted as presenting any abnormality (p. 96), while anaesthetics were required in 46 cases only (p. 98); of the 81 gynaecological cases 49 only required operative treatment (p. 98). On p. 114 it is stated that "During the first eight weeks of this year [1921] more than double the number [of maternity cases] that can be accommodated have been booked for confinement at the hospital."

Turning to the consideration of the care of school children, here again the initial function of the public health service is obscured by the additional activities which are undertaken. On p. 9 of the report it is stated that "The work of medical inspection of children in the schools has been in abeyance in Willesden since December 3rd, 1915." The reason for this is that since that date "The authority has directed attention to ailing children and the provision of remedial measures for the conditions found." The significance of routine inspection lies, of course, in the provision thus afforded for the detection of every defect at the earliest possible date; omission of this inspection allows the development of conditions which might be more advantageously checked at the

very outset. Of the 16,417 medical defects which came under notice during 1920 treatment was secured for 97.1 per cent.; of the total treated 88.7 per cent. were dealt with through the clinics, the municipal hospital, or home visitation, while 11.3 per cent. were dealt with by private practitioners, voluntary hospitals or other charitable institutions, or the Poor Law (p. 9).

It is obvious, therefore, from this report that, at any rate under existing conditions in Willesden, inadequate provision is available for the work with which the public health service is attempting to cope. Yet for this work the private practitioners of Willesden are well qualified, and they are eager to undertake it. An already overcrowded and overworked infectious diseases hospital is being burdened with a large number of normal maternity cases, in addition to other non-infectious cases; the school medical service is grappling, under difficulties, with the treatment of defects, the development of which might conceivably have been prevented by routine inspection; while the scientific study of preventive measures is necessarily shelved.

It is stated on p. 13 of the report that the municipal hospital and clinics established at Willesden are "much on the lines indicated in the [Dawson] report." One of the essential features, however, of the organization recommended in that report was the relations to be set up between private practitioners and the public health service. To the Willesden municipal hospital the private practitioner has no access. A lesson emphasized by the medical services in the war must evidently be learned afresh—that an administrative branch, a research branch, and a clinical branch of preventive medicine are all necessary, but require different qualities and different experience. All are inter-dependent, and all contribute to the strength of each; but while officials may best carry out administrative and, to a large extent, research duties, the clinical side is best performed not by the development of a class of practitioners who deal each with one small specialty, but by the doctor who brings the widest possible experience of disease in general to bear on the consideration of individual conditions—that is, by the general practitioner. Especially is this so in the treatment of women and children, and, in the long run, the national well-being reaps the benefit.

OVARIAN TRANSPLANTATION OR GRAFTING.

Professor Tuffier has had more than fourteen years' experience of ovarian grafting, and during that time he has made 230 transpositions of one or of both ovaries.[1] His purpose was twofold: (1) To maintain or to re-establish the normal state and menstruation after the removal of the ovaries and the tubes, the uterus having been left, and (2) to lessen the troubles following upon removal of the uterus and the ovaries. The great majority (214) of the transplanted organs were in a fresh condition, but a few (16) had been kept in ice; the latter were quickly absorbed. In 60 cases the grafting was done after total or subtotal hysterectomy, in 156 it was carried out when the whole uterus was preserved, and in 4 the lower two-thirds was retained; in the remaining 10 cases the kind of intervention was not noted. There was no mortality which could be ascribed to the grafting; four women died (1.8 per cent.), but the cause was the original condition (abdominal infection) which had necessitated the operation. In a single case the transplanted ovary had to be removed later on account of the trouble it set up. When the graft was without effect it disappeared, being absorbed in from six to twenty-four months.

In a few cases (20) Dr. Tuffier made a true graft, that is to say he transplanted one or both ovaries from one woman to another. This he terms homografting. In some of these cases the uterus had been retained, but in not one of them was menstruation re-established; further, in those in which both uterus and adnexa had been removed no improvement in the symptoms caused by the premature menopause followed. Tuffier gave up true grafting, therefore, as ineffective, and continued to practise only transplantation of organs in the same patient. He does not propose an explanation of the failure of grafting from one woman to another, but the experiments of S. Voronoff[2] suggest a cause. Voronoff found that heterogeneous grafting could be done if what he termed the biological conditions were present. In other words, it succeeded when the animals used were not only of the same species but were closely related, and these conditions he found among the ewes of a flock of sheep in which fertilization had been effected by one ram or its male offspring.

In the rest of Tuffier's cases (203) the ovarian transposition took place within the individual ("auto-grafting"); in a very few cases (6) both kinds (homo- and auto-grafting) were employed. In some 71 cases the place chosen for the transplanted ovary was the subcutaneous tissue; but in most of the rest it was the subperitoneal cellular tissue. In 120 cases one ovary was used, in 18 both were transplanted, and in 65 there was no record. The gland was normal or sclerotic, sometimes it contained microscopic cysts, and it had generally been in contact with an infected focus; for the condition for which the organs had been removed was most commonly salpingitis in a state of active or passive suppuration. Most of the patients had been ill for six months or a year. Age was an important factor in deciding whether success or failure followed; thus the best result (re-establishment of menstruation for twelve years) was obtained in a woman upon whom Tuffier had operated at the age of 18 years. The grafting was not as a rule followed by pain or other symptom for four or five months; thereafter, if it were successful, the gland began to show the phenomena of periodic congestion and tenderness, then these became more marked, and, later, menstruation appeared (the uterus having been preserved, of course, either wholly or in its lower two-thirds). In 56 (76.7 per cent.) out of 73 patients in whom these conditions were present menstruation reappeared, usually in from five to seven months after the grafting. If the menses appeared two months after the grafting Tuffier regarded the phenomenon as due to the leaving behind of a small piece of ovarian tissue at the time of the operation. During the time intervening between the transplantation and the reappearance of menstruation the women suffered from the usual symptoms of an induced menopause, and these symptoms disappeared with the return of the periods. The menstruation could therefore be regarded as truly physiological and as due to the grafting. Indeed, in one case in which Tuffier had to remove the graft later, the re-established menses again stopped. The menstruation thus re-established was rarely as regular (in quantity, duration, and rhythm) as in normal circumstances, and it continued to recur for a varying period (from six months to two years in 45 out of the 56 cases).

Tuffier has founded a theory of the causation of menstruation on these clinical results; but a more

[1] *Bull. de l'Académie de Médecine*, 1921, 3 S., lxxxv. 99-105.

[2] *Trans. Internat. Congr. Med.*, 1913, London, Sect. VII, Surgery, Pt. II, 351.

important matter, perhaps, is their bearing upon the state of patients who have had their tubes and ovaries removed. In such patients transplantation of the excised ovaries to the cellular tissue under the peritoneum would seem to be both a safe and a salutary procedure. Menstruation may not be as normal as it was before, and it may not last so many years as usual, but the transplantation at least would seem to prevent the sudden supervention of a premature menopause, with its attendant troubles. Bazy[1] is not impressed greatly by the results Tuffier has obtained, neither does he agree with him fully as to the necessity for ovarian grafting. He thinks the evils associated with the menopause brought about by operative means have been exaggerated—for instance, the obesity often noted is not always due to the menopause; it might occur apart from it at this time of life, and does so occur in many men; further, the ovarian or other organic extract can always be given in cases troubled with distinct symptoms. He would never transplant ovaries from one woman to another. It may be interesting to note the morbid states for which the original operation was performed in the 56 cases in which success attended the ovarian transplantation: 46 were instances of non-suppurative salpingitis, 2 were cases of salpingitis associated with ectopic pregnancy, 3 were suppurative salpingitis, 1 was salpingitis with appendicitis, 2 were cystic salpingitis, 1 was an inflamed cyst, and 1 was a fibroid of the uterus. Tuffier's communication is a sequel to one which he read in 1914 at London and published in 1915.[2]

IMPERIAL CANCER RESEARCH FUND.

THE seventh Scientific Report of the Imperial Cancer Research Fund has been issued this week by the Executive Committee.[3] It contains four reprints and three unpublished papers dealing with two important aspects of cancer research, namely, the investigation of the peculiarities of cancer cells, and the study of the origin of cancer. The Director, Dr. J. A. Murray, in a prefatory note, remarks that increased knowledge in both of these directions is essential to progress, and it might be expected that the study of the origin of cancer should precede the study of the fully developed disease. Experimental investigation of cancer has, however, followed the reverse order: attention has been diverted for the present from the phenomena of tumour and tissue immunity to the fundamental physiological processes of normal and cancerous cells. The relation of water content to rate of growth and the phenomena of cell respiration are dealt with in papers by Drs. Cramer, Drew, Russell, Gye, and Woglom. These workers have purposely confined themselves to an objective presentation of their actual results and the conclusions which necessarily follow from them. The same restraint in speculation has been exercised by Drs. Murray and Woglom, in presenting the preliminary results of their experiments on the production of squamous cell carcinoma in mice by the application of coal tar, of which an account was given by Dr. Murray to the Section of Pathology and Bacteriology at the Annual Meeting of the British Medical Association at Newcastle.[4] This paper is followed by one on lymphatic dissemination of cancer by Dr. Murray, and another by Dr. Da Fano on the Golgi apparatus of tumour cells. We hope to deal further with the report in a subsequent issue.

[1] *Bull. de l'Académie de Médecine*, 1921, 3 S., lxxxvi, 121.
[2] Transplantation of Ovaries, *Surg., Gyn., and Obstet.*, 1915, xx, 30.
[3] London: Taylor and Francis, 1921, price 15s.
[4] BRITISH MEDICAL JOURNAL, November 12th, 1921, p. 795.

POST-GRADUATE WORK IN THE PROVINCES.

SOME years ago we drew attention to the post-graduate courses in applied pathology which Bristol University had organized in many towns in the West of England. During the war post-graduate work had to be suspended, but it has now been resumed. The success which attended the 1921 autumn courses in fractures, heart disease and vaccine therapy in Trowbridge, Swindon, and Dorchester has emboldened the Post-Graduate Committee of the University to embark on a wider scheme. It now proposes to extend the project to areas containing larger hospitals. In plain words, the University says to these centres: "The practitioners within twenty miles radius of your hospital are hungering for opportunities to get into touch with newer developments. They cannot leave their work to go to London or Paris, but they can and will come to your hospital to see your clinical material, and to hear lucid and practical exposition of medical scientific advances for an hour each week. It is a duty that you should make such provision. The University will place at your disposal its experience and organization for the conduct of such courses, or it will co-operate with you and issue the necessary details under its name. Here is a list of lectures which you may select from for such a course. New work on the heart, the alimentary system, renal conditions, anaesthesia, pathology, ophthalmology, and so forth—some thirty in all." The syllabus we have received contains details for the arrangement of courses, a specimen card of announcements, and the synopses of the lectures available. The project need not be confined to the West of England. It is applicable to all areas when there are hospitals of 10 to 100 beds. Of course it is not to be expected that Bristol could send its lecturers all over the country, but its proposals might with advantage be carried out elsewhere. We understand that the Director of Post-Graduate Studies, Bristol University, will be glad to send details of the scheme to any applicant.

VITAMINS AND HEALTH.

THE Lady Priestley Memorial Lecture was delivered on November 16th, under the auspices of the National Health Society, by Professor Edward Mellanby, whose subject was "Vitamins and health." Much of what he said is familiar knowledge to our readers, but a concise summary of the position may be welcomed. Sir James Crichton-Browne presided, and his story of the lady who went into the grocer's shop and asked for a pound of mixed vitamins greatly pleased the audience. Professor Mellanby said that his point of view was that of a laboratory worker, and his purpose was to present evidence that certain diseases were due to apparently small dietetic changes rather than to what were vaguely called unhygienic conditions. Much of the ill health of the country was due to wrong diet, and the subject of dietetics was only now coming into its own. The discovery of vitamins had forced physiologists and medical men to recognize that the quality of the food eaten was at least as important as the quantity. A fat, lethargic, rachitic baby was far worse nourished than a thin, active, healthy one. The chemical composition of the three vitamins—fat-soluble "A," water-soluble "B," and antiscorbutic—was so far unknown. The vitamins could only be studied in their results, particularly in deficient dieting experiments on animals. The deficiency diseases in whose causation the absence of vitamins played an important part included beri-beri, scurvy, and rickets, also such conditions as defective formation and bad arrangement of teeth and a form of night blindness. A diet made up only of lean meat, white fish, bread, rice, oatmeal, vegetable margarine, tea, sugar, and jam was deficient in two vitamins, and might be expected to produce poor health, diminished resistance to disease, and, in the case of young children, rickets and bad teeth. It was specially important that

the diet of children and adolescents should contain an abundance of fat-soluble and antiscorbutic vitamins by including in its composition plenty of milk, eggs, suet puddings, fat fish such as herrings and mackerel, fruit, especially oranges and lemons, and green and other vegetables. The lecturer illustrated by means of lantern slides the investigations of Mrs. Mellanby and himself upon the importance of vitamins in the production of good bony and dental structure. In puppies he claimed to have been able to produce experimentally good or bad teeth by small alterations in diet. Certain diets containing cod-liver oil produced perfect teeth in hard well-grown jaws, and when linseed oil was substituted the teeth became irregular and the jaws soft and small. Much was said a few years ago about the necessity for cleaning the teeth, giving crusts to children, withholding sweets, and so on, but Professor Mellanby maintained that it was necessary to find out, not only what happened in the mouth itself, but what happened after the foods were absorbed. Probably the most important factor in the solution of the dental problem was the discovery of the cause of badly formed teeth. Even the housing problem took second importance to dietetics in regard to infant mortality, as illustrated in the bad housing conditions in the Hebrides and the relative robustness of the children. Given milk, egg, and orange in the diet of a child, it did not matter much, from the strictly dietetic point of view, what else was included. Professor H. R. Kenwood, in moving a vote of thanks to the lecturer, pointed out how once more science had come in and endorsed long practice and experience. Before anything was known of vitamins it was understood that scurvy was produced as the result of insufficient fresh vegetables. The vote of thanks was seconded by Sir Humphry Rolleston, who remarked upon the valuable information which became public property through the medium of these memorial lectures.

HAEMOLYSIS IN PERNICIOUS ANAEMIA.

MANY of the older writers inclined to the view that pernicious anaemia depended on a faulty production of red blood corpuscles; but at the present time this hypothesis has, except for aplastic anaemia, been abandoned in favour of the conception of active blood destruction due to a haemolytic toxin. In the course of a research on transfused blood, conducted in the Department of Experimental Bacteriology of the Mayo Foundation, Rochester, Minnesota, Winifred Ashby[1] found that there is a periodic blood-destroying activity both in men and women, and that in the latter it coincides with menstruation. The removal of transfused blood probably takes place as part of a period of blood-destroying and blood-producing activity—a metabolic cycle, evidence of which is shown by menstruation in women. Patients with blood belonging to Groups I, II, or III, and suffering from conditions other than blood diseases, were transfused with blood of Group IV, and then, by diluting the blood, which leads to agglutination of the native red corpuscles but leaves the red cells of Group IV origin free, the persistence of this latter can be estimated, and the length of life of transfused blood corpuscles determined. The question whether or not there is a haemolytic toxin at work in pernicious anaemia was investigated by comparing the curves of blood elimination of Group IV red blood corpuscles in thirty-three patients (not of Group IV blood) suffering from this disease, and transfused with Group IV blood, with the curves from patients without any blood disease and similarly transfused. These observations showed that, although in pernicious anaemia blood destruction is in some cases and at certain times considerable, it is on the whole quiescent; transfused Group IV red corpuscles are, indeed, usually not eliminated so soon as they are in persons without blood disease similarly transfused. The fact that Group IV red corpuscles are not eliminated rules out the activity of any corpuscular poison during these periods; for if it be assumed that there is a poison, which, however, does not attack Group IV red blood cells, then the incidence of pernicious anaemia should be low in patients with Group IV blood; but among 189 cases of pernicious anaemia 52 per cent. had Group IV blood. The evidence brought forward is therefore against the existence of a haemolytic toxin in pernicious anaemia. The periods of active haemolysis, exceptionally seen in this disease during a course of transfusions, are probably due to activity of the blood-destroying organs of the body rather than to the intrinsic weakness of the corpuscles. The data on which the haemolytic nature of pernicious anaemia is based can be interpreted in another way: the increased activity of the bone marrow may be more apparent than real, for if there were present a factor retarding the speed of maturation and division while the physiological stimulation to erythrocyte production induced by anaemia increased the number of dividing cells, such a picture, though with a decrease in the total output of cells, might result. The increased haemosiderin in the tissues is only evidence that the iron is not in circulation, as indeed is seen in haemochromatosis, in which there is no evidence of a haemolysin. Increased output of bile pigment cannot be accepted as evidence of increased haemolysis, because Whipple and Hooper have shown that bile pigment is derived from other sources besides haemoglobin. It is therefore doubtful whether haemolysis is such an important etiological factor in pernicious anaemia as it is at present usually assumed to be.

[1] Winifred Ashby, *Journ. Exper. Med.*, Baltimore, 1921, xxxiv, 127-166.

CHOLERA IN THE EARLY THIRTIES.

THE introduction of cholera into England in 1831 resulted in the establishment of a Central Board of Health and of local boards in those towns in which the disease was ultimately prevalent. The cause of the disease was not then known, although its infectious nature was fully realized, and it was classed among the "filth" diseases. The preventive measures which were applied were consequently carried out on lines which, though empirical, were in accord with our present day knowledge. It is greatly to the credit of the medical profession of those days that they were able to grapple with the sudden outbreak of a disease concerning which most of them had had no previous experience, and in the absence of any organized preventive machinery. An extremely interesting account of the epidemic as it affected Sheffield and the immediate neighbourhood in 1832 has been compiled by Dr. John Stokes, one of the physicians to the Sheffield Hospital for Sick Children. With much painstaking research he has drawn up from official sources and contemporary literature an instructive and fascinating chronicle. The Privy Council had already formed a Central Board of Health in 1831, and in February, 1832, there was passed an Act of Parliament enabling the Council to make orders, rules, and regulations for the prevention of cholera, and for the relief of persons suffering from, or likely to be affected by, the disease. Local boards were constituted under the friendly supervision of the central board, and the orders and regulations of the latter body were administered by the local boards. One such order was that every medical practitioner in an infected area should send in a daily report of the condition of all his cholera cases or those affected with any other disease in any way resembling cholera; a penalty might be imposed for neglecting to send this report. The local boards had very extensive powers for the purchase and provision of medicine and for providing medical assistance, medical inspectors, and nurses. They could carry out certain sanitary improvements, such as the removal of nuisances and cleansing of drains, and could provide burial grounds and pay funeral expenses. The cost of these activities was paid for out of parish funds.

The population of Sheffield in 1832 was about 90,000, and although it had the natural advantage of being built on the slopes of hills, the inhabitants were living under very insanitary conditions. There were a few rubble sewers, leaky and inefficient, the water supply was scanty and obtained from stand-pipes, and the houses were for the most part crowded together and in many instances back-to-back. The local action taken at the outset of the epidemic is worth noting. A notice was issued respectfully calling upon the inhabitants to cleanse their houses, yards, premises, etc. An address was drawn up by a committee of doctors containing directions regarding ventilation, cleanliness, infection, and habits; under the last heading the use of tobacco was condemned. The local press gave prominence to the following admirable advice: "Cholera attacks chiefly the dirty, the idle, the drunken, and the disorderly. Those, therefore, who wish to escape the disease should be sober, industrious, and steady, and keep themselves and their houses clean. If, as soon as anyone begins with the cholera, he can get a doctor to attend him, he will be likely to recover; but if he cannot get a doctor until he has been ill several hours, he will be almost sure to die."

AN INCIDENT IN THE HISTORY OF INOCULATION AGAINST SMALL-POX.

In a relatively unknown little book on the Shetland Islands,[1] written by Dr. Robert Cowie and published in 1871, a method of preventive inoculation for small-pox is described that is of considerable interest from the historical point of view. Variola appears to have wrought much havoc among the Shetland islanders during the eighteenth century. In 1720 the disease was so fatal as to be termed the *mortal pox*. The disease was very fatal in 1760 also. Inoculation was introduced, but owing to the high fee (2 or 3 guineas) of the operator only ten or twelve persons availed themselves of it. The malady reappeared in 1769, and recourse was had more generally to inoculation; practised according to the usual method it appears to have been followed by the usual results, namely, diminution of the mortality, but spread of the disease. The author continues: "The mortality continuing very great, a common, uneducated, but very able peasant, named John Williamson, invented an improved method of inoculation which, had it not been superseded by the more valuable discovery of vaccination (1796), I venture to say would have proved one of the most valuable discoveries in modern medicine. Williamson's method is thus described in 1792 by his contemporary, the Rev. Mr. Dishington: He is careful in providing the best matter, and keeps it a long time before he puts it to use—sometimes seven or eight years; and in order to lessen its virulence, he first dries it in peat smoke and then puts it underground covered with camphor. Though many physicians recommend fresh matter, this self-taught practitioner finds from experience that it always proves milder to the patient when it has lost a considerable degree of its strength. He uses no lancet in performing the operation, but by a small knife made with his own hands he gently raises a very little of the outer skin of the arm so that no blood flows, then puts in a very small quantity of matter, which he immediately covers with the skin that had been thus raised. The only plaster that he uses for healing the wound is a bit of cabbage leaf. It is particularly remarkable that there is not a single instance in his practice where the infection has not taken place and made its appearance at the usual time. He administers no medicine during the course of the disease, nor does he use any previous preparation. Mr. Dishington also informs us that several thousands have been inoculated by Williamson, and he has not lost a single patient." The principles here employed of killing off contaminating bacteria by peat smoke and camphor, and of attenuating the virus through age, are of considerable historic interest. Dr. Cowie, writing almost a century later, suggests that possibly the same principle could be applied to the viruses of scarlet fever and measles for prophylactic purposes; but, so far as we are aware, bacteriology even to-day has not advanced thus far, though possibly the experiments by Kusama as to typhus fever, and Takahashi as to scarlet fever, noted in our issue of August 13th, p. 249, may indicate a move in this direction.

[1] *Shetland and its Inhabitants.* By R. Cowie, M.A., M.D. Aberdeen: Lewis Smith; and Edinburgh: John Menzies and Co.

METEOROLOGICAL CONDITIONS AND PLANT DISEASE.

An interesting discussion on plant pathology in relation to meteorological conditions took place at the meeting of the Association of Economic Biologists on November 18th. Dr. E. J. Butler, who introduced the subject, emphasized what is still a new conception—that the relation not only of the parasite but also of the host to the prevailing temperature and humidity has to be considered. It is not sufficient to study the parasite; the host-parasite complex must be studied, too. In the spread of mildew, for example, which is said to be favoured in England by a dry year, it is not—or not merely—that the environment assists the growth of the fungus, but that it lessens the turgescence of the host. In what is known as "sore skin" in the cotton plant, parasitism is complete at a certain low soil temperature; a few degrees higher the toxin formation is still rapid and the plant growth feeble, but higher still the vital powers of the cotton plant come into play, and all that the parasite can do is to produce a scar, and at a degree or two above this point the parasite is powerless to work ill. Rust of wheat depends upon comparatively slight temperature variations, and so does potato blight, which requires a cool summer. A worm which attacks rice in India can only do so at a certain saturation of the atmosphere. Climate has the most precise and predictable effect upon foot-rot in maize and wheat, although the effects are different, and in some cases contrary, in the two cereals. Again, in the flower belts of Holland, where much is being done to combat disease by temperature control, what is right for the hyacinth is not right for the narcissus. It is significant that the modern worker in plant biology is growing sceptical of the results of field observation unless controlled and elucidated by the more exact methods of the laboratory.

SOUTH AFRICAN MEDICAL CONGRESS.

The seventeenth South African Medical Congress was held at Capetown from October 10th to 15th, and was a most successful function. The meetings were held in the buildings of the University of Capetown, and the attendance was very representative, visitors being present from all parts of the Union of South Africa and even from Rhodesia. The president of the congress was Dr. Hugh Smith, a well known physician and lecturer on dermatology in the University of Capetown. He has been an active member of the British Medical Association for many years and has served on its South African Committee. Dr. C. M. Murray was vice-president, Dr. Lindsay Sandes secretary, and Dr. du Toit treasurer. The congress was opened by Sir Carruthers Beattie, Principal of the University of Capetown.

Sir E. Marriott Cooke, K.B.E., M.B., lately a Commissioner of the Board of Control, has been appointed an unpaid Commissioner of the Board of Control for Lunacy and Mental Deficiency.

The first meeting of the Dental Board of the United Kingdom will begin at 2 p.m. on Wednesday, December 7th, at 44, Hallam Street, London, W.1, with the Right Hon. Francis Dyke Acland, M.P., in the chair.

An occasional lecture will be delivered at the Royal Society of Medicine, 1, Wimpole Street, W., on Monday, November 28th, at 5 p.m., by Dr. Guelpa of Paris on "The treatment of diabetes and gout by disintoxication." The lecture will be followed by a discussion and visitors will be welcomed.

FINANCIAL POSITION OF THE VOLUNTARY HOSPITALS.

Sir Napier Burnett, director of the Hospital Services Department of the Joint Council of the Order of St. John and the British Red Cross Society, has published in pamphlet form a report on the financial position of the voluntary hospitals of England and Wales for the year 1920. Although the hospitals in the London area, which are under the supervision of King Edward's Hospital Fund, are not included in the survey, the figures presented do help considerably to locate the hospital problem. In particular the analysis of the sources from which hospital income is derived is useful as underlining the directions in which hospital finance might be better co-ordinated and, in some areas, hitherto unconsidered sources of supply explored.

The number of hospitals reviewed is 572, out of a possible 647, and these are divided into three groups—namely, the large hospitals with 100 or more beds, the intermediate hospitals with less than 100 but not under 30, and the small or cottage hospitals with less than 30. (We refer to these groups later as A, B, and C respectively.) The first group comprises 107 hospitals and 20,184 beds; the second, 164 hospitals and 8,437 beds; and the third, 301 hospitals and 4,271 beds. The smaller hospitals evidently are not always fully occupied; in this group the proportion of available beds occupied during 1920 was 69.43 per cent., as against 81.92 per cent. in the first group. This suggests that more might be done to link up the smaller hospitals having empty beds with the larger hospitals having long waiting lists.

Hospital Income and Expenditure.

The student of hospital finance has to beware of the fallacy underlying gross incomes. How great a disparity there may be between these and ordinary incomes is shown in the following table, giving the position in 1920:

Group.	Total Income.	Ordinary Income.	Total Expenditure.	Ordinary Expenditure.	Surplus on Total Income.	Surplus or Deficit on Ordinary Income.
	£	£	£	£	£	£
A	4,060,073	2,510,968	3,408,452	2,959,029	651,621	−448,061
B	1,336,558	967,826	1,125,998	1,005,608	210,560	− 37,782
C	730,245	494,149	554,985	471,262	175,260	+ 22,887

Thus a surplus of more than a million on the total figures becomes a net deficit of £462,956 on the ordinary. The reason is that the total income includes large amounts earmarked for special purposes, which cannot be spent on maintenance, and also an allocation of £309,000 from the National Relief Fund to the first and second groups of hospitals. The deficit is rather less than in 1919, when it was £498,088 for practically the same aggregate of hospitals. Were the 112 voluntary hospitals of London included, this deficit would be doubled. Of the 107 large hospitals in this survey, only 23 had a surplus on ordinary income. The ordinary income per bed increased from £92 in 1919 to £121 in 1920, but the ordinary expenditure per bed all but kept pace. Sir Napier Burnett believes that the high-water mark of hospital expenditure was reached in 1920, and that the present year will show a reduction.

Sources of Hospital Income.

A significant feature of the analysis of sources of income is the widely varying part which workmen's contributions—that is, money from employees by voluntary weekly levies and the proceeds of the various local Saturday Funds—play in hospital income. In one hospital as much as £114 per bed was forthcoming from this source; in others, in not less populous districts, only £2 per bed. In the case of the thirteen teaching hospitals, workmen's contributions range from less than 2 per cent. of the total income up to nearly 40 per cent. Patients' payments in these thirteen hospitals range from nothing up to 18 per cent. of the income. The contributions of patients are proportionately larger in the smaller hospitals, where a weekly charge for maintenance is commonly made. On the other hand, contributions from public services are smallest in those hospitals. The proportions of ordinary income derived from the various sources are best shown in the form of a percentage table:

Group.	Interest on Investments.	Workmen's Contributions.	Payments by Patients.	Payments by Public Services.	Subscriptions.	Donations.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
A	14.07	22.43	5.95	17.37	14.25	14.01
B	14.81	21.75	12.92	12.09	13.00	12.76
C	13.13	11.48	22.19	3.46	16.73	14.55

The sum of £38,939 was received by the hospitals for services rendered to patients under the National Health Insurance Act. The total income from the public services was somewhat smaller in 1920 than in 1919 owing to the withdrawal of military patients. The total of patients' contributions, on the other hand, went up from £232,929 to £384,253, and organized workmen's contributions showed an even more impressive increase, from £518,043 to £830,533.

Hospitals Associated with Medical Schools.

Included in the group of large hospitals are thirteen with medical schools. These had 4,388 available beds last year, and treated 68,966 in-patients and 457,635 out-patients. Their deficit on ordinary income was out of all proportion to that of the others. For the whole group of 107 large hospitals the deficit was £448,061, more than half of which (£242,359) was accounted for by the deficit on these thirteen teaching hospitals. The explanation given is that these hospitals, staffed by men of special eminence, and possessing special departments with expensive apparatus, attract the more serious types of disease; also that research as well as clinical work is carried out in them. Considerable expenditure is entailed by the special facilities necessary for students. One hospital estimates that the annual cost per occupied bed is from £20 to £30 greater in the case of a hospital with a medical school attached. Of the eleven hospitals replying on this subject nine reported that they received no income towards this special expenditure from any Government authority or local medical school, and eight, that students' hospital fees formed no part of the ordinary hospital income. Sir Napier Burnett points out that in Scotland there are five hospitals associated with medical schools where the fees received by the hospitals from the students amounted to £10,795 in 1920, and that one of these has since increased the students' fees by 50 per cent. Sir Arthur Stanley, in a preface to the pamphlet, suggests that financial assistance might be obtained from the Government on the ground of the training work which is done in these institutions.

The report as a whole goes to show that there is a very generous measure of confidence on the part of the public in the voluntary system, but that there is great lack of uniformity in different parts of the country, especially with regard to the organized collection of workmen's contributions and patients' payments.

At the thirtieth French Congress of Surgery, held at Strasbourg in October, the presentation was made to Dr. Jules Boeckel, president of the congress, of a portrait medallion, in recognition of his eminence as a surgeon and of his having edited for forty years the *Gazette médicale de Strasbourg*, published in that city in the French language.

Cornell University Medical College is opening a clinic for paying patients of moderate means, which is to be held every afternoon from 1.30 to 4 p.m., and on two evenings each week. The fee will be 1 dollar for each visit for examination and treatment, but the diagnosis of cases requiring special examination and study, with group consultation and a written diagnosis, will cost 10 dollars. The physicians attached to the clinic are to receive salaries.

England and Wales.

London Hospitals' Expenditure in 1920.

King Edward's Hospital Fund for London has issued its eighteenth annual statistical report[1] on the ordinary expenditure of the London hospitals, numbering 112, which apply for grants from the Fund. During the war the admission of naval and military patients, and after the armistice the change back to civilian work, caused great fluctuations in the numbers of occupied beds and in the cost of working, and made comparison with other years difficult. These fluctuations had ceased, however, by the end of 1919, and it is possible, therefore, to make direct comparison between 1920 and 1913. In the hospitals classified in the report, together with St. Bartholomew's and the Cancer Hospital, the number of beds in average daily occupation in 1920 was 10,465, and to them 165,787 in-patients were admitted; the number of out-patients during the year was 1,482,894, and the attendances of out-patients amounted to 6,473,831. The total ordinary expenditure of these hospitals for the year, including maintenance, administration, rent, rates, and taxes, but excluding capital expenditure, interest on borrowed money, and contributions to the maintenance of convalescent homes and country branches, amounted to £2,698,921; the corresponding figure in 1913 was £1,149,106. The voluntary hospitals had thus in 1920 to provide an additional amount of £1,549,815 as compared with 1913, or an increase of nearly 135 per cent. In the effort to meet this rising expenditure the hospitals succeeded in increasing their income by 66 per cent. in comparison with 1913. Their present difficulties are, therefore, due not to any falling off in the support from the public, but to the fact that the increase of income has so far failed to keep pace with the increase in expenditure. The amount collected from the public in subscriptions, donations, etc., increased by about 75 per cent.; payments by public authorities for specific work done, which amounted to only £11,000 in 1913, brought in about £300,000 in 1920; contributions by individual patients towards the cost of their own treatment increased in the same time from £78,000 to about £240,000. The deficiency for the year 1920 was made up by the emergency distribution of £250,000 from the King's Fund, and the grants of £200,000 made by the National Relief Fund in reduction of war deficits, but neither of these grants can recur. The method of meeting the deficiency in 1921, and of re-establishing the finances of the voluntary hospitals on a permanent basis, has been surveyed by Lord Cave's Committee. A Voluntary Hospitals Commission set up in accordance with its recommendation, with the King's Fund as the Central Committee for the London district, and the hospitals themselves, are now actively engaged in working out the details of the scheme.

Liverpool Medical Institution.

The annual dinner of the Liverpool Medical Institution was held at the Adelphi Hotel on November 10th, with Dr. J. E. Gemmell in the chair. The toast of "The City and University of Liverpool" was proposed by Dr. R. W. MacKenna, who said that the link between the university and the city was already a close one, but it ought to be closer. The university owed an incalculable debt to the citizens of Liverpool and the city council, which it did its utmost to repay in the quality of the work done within its walls and the contributions it was daily making to the sum total of human knowledge. The Lord Mayor, in response, said that during his year of office he hoped to get into closer and more intimate association with the philanthropic work in which the medical profession were so conspicuous. Dr. J. G. Adami, Vice-Chancellor of the University, also responded. He emphasized the significance of the work of the Medical Institution to the corporate life of Liverpool, and to the labours of the medical profession in the city. It was too little realized what the Medical Institution meant to the university. The idea of establishing a university college originated at a meeting of the faculty of the medical school in 1877, who decided that they would consult with other bodies in the city to see if it were not possible to start a college for higher learning. The toast of "The Liverpool Medical Institution" was proposed by the Rev. J. S. Macdonald, who remarked that there were two men only whom the public called up in the middle of the night—one was the doctor and the other the plumber. In acknowledging the toast the President claimed that the Medical Institution was of benefit not only to the medical profession but to the public at large. It was now in its eighty-third year, and he was glad to say that with the restoration of normal conditions after the war their younger members were keenly carrying on the traditions of the institution.

The National Council for Combating Venereal Diseases.

At the quarterly meeting of the National Council for Combating Venereal Diseases, on November 14th, Lord Gorell, the president, delivered an address in reply to critics of the Council's policy. Lord Gorell said that the Council in recent months had had to face an organized campaign of misrepresentation. Recently an agitation had developed in favour of reducing the Government grant for venereal clinics, ostensibly on the ground of economy. It seemed obvious to him that it was more economical to treat a person at a clinic than as an in-patient at a hospital. But this agitation, under the popular slogan of economy, was really designed to press forward the policy of self-disinfection, for which the claim was made that it would do away with the need for clinics. Such an assumption needed to be examined. The public was unaware of the facts which pointed to the failure of self-disinfection. The experience of Germany, where for five years there had been an intensive campaign in favour of self-disinfection, with automatic machines for packets in some towns, as well as a broadcast distribution of leaflets, was laid before the North European Regional Conference of Red Cross Societies at Copenhagen this year. There was no evidence of any fall in the incidence. In one Dresden clinic, where in 1919 only 14 boys and 60 girls between the ages of 14 and 18 were treated, 105 boys and 116 girls were treated in 1920, and 33 boys and 61 girls in the first three months of 1921. Again, in Constantinople, where there was definite instruction in these methods, 560 out of 2,000 women examined in a recent month were found to be infected. Sir James Crichton-Browne, lecturing at Bath in August, had said that the practice of immediate self-disinfection was as easy as brushing the teeth; it was an unfortunate illustration, for the toothbrush did not avert the dentist. But the medical correspondent of the *Times* had followed Sir James's remark with the statement that immediate self-disinfection would rid us of venereal disease. It was true, within limits, that if methods of self-disinfection were properly and immediately applied by intelligent people they did disinfect. Sir Archdall Reid had said that the venereal plague could be completely stayed by simple measures, but his figures in almost all cases pertained to army units where individual instruction was possible. Lord Gorell cited the army figures given by the Secretary for War in the House of Commons on November 3rd, and also gave less recent figures for the Australian and American armies to show that self-disinfection did not reduce incidence. The War Department of the United States came definitely to this conclusion in 1917 after several years' experience. But up-to-date figures were also available from a prominent venereal disease clinic in London. During the three months from June to September last, 375 men were treated at this clinic, 190 of whom had taken precautions after exposure to risk. In 101 of these cases—that is to say, more than one-fourth of the people who came to the clinic—the methods used were those advocated by the Society for the Prevention of Venereal Disease. An analysis of these 375 persons showed that 56 of them had been infected when more or less drunk. Lord Gorell added that on the previous day he had received a circular recommending the Society for the Prevention of Venereal Disease, together with a letter from the secretary of that society, stating that its methods were carried out "with the utmost care and reverence for youth." He could not accept that statement when that society was spreading its leaflets broadcast and putting up its posters for every boy and girl to read. The Council had a difficult path to pursue, but its position was based on facts and not on

[1] *King Edward's Hospital Fund for London: Statistical Report on the Ordinary Expenditure of One Hundred and Twelve London Hospitals for the Year 1920.* London: Spottiswoode, Ballantyne, and Co., Ltd. 1921. (Price 1s. 6d. net; 1s. 9d. post free.)

assumptions, and it would go forward unflinchingly on its most necessary and important task. Lord Gorell also said, with regard to the experiment of ablution centres at Manchester now being carried out by the Ministry of Health, that he would propose to the Council that a committee should be appointed to collect the evidence and report to the next general meeting.

A New Physical Clinic at Sunderland.

On November 19th a specially built pavilion—the Richardson—was formally opened at the Sunderland Royal Infirmary, for that institution, for its offshoot the Children's Hospital, and for the surrounding population of 300,000 which they serve, as a physical clinic, but called the "Orthopaedic Department." The medical officer in charge is a paid officer, having under him a staff of assistants (male and female), trained and certificated in massage, medical electricity and remedial (including gymnastic) exercises. He has also under him the *x*-ray department. They work in collaboration with the physicians and surgeons. The plan of the one-storied brick building is compact, complete, and easily worked, and was designed by the senior honorary surgeon in conjunction with the architects, Messrs. W. and T. Milburn. The building includes a waiting room, cloak rooms, an office, a medical officer's consulting and examination room, dressing cubicles and rest room; a large room for massage, electrical treatments, radiant heat and light beds, remedial and gymnastic exercises, with or without mechanical apparatus, and a spray bath; four bath rooms—one for whirlpool and contrast baths, another for Plombières treatment, a third with long baths (aerated and medicated) and an Aix douche, and the fourth for Vichy and spray baths. There is also a room with paraffin wax baths for the arm and leg, and a heated linen room. It will be seen that the department includes a completely equipped hydropathic installation. The cost of the building and equipment was £9,000.

Birmingham Bequests.

The late Mr. William Morton, of Moseley, Birmingham, has bequeathed £500 each to the Queen's Hospital, Birmingham, the Birmingham General Dispensary, the Birmingham and Midland Hospital for Women, the Birmingham Dental Hospital, and the Children's Convalescent Home, West Kirby, Cheshire; £250 each to the Birmingham General Hospital, the Birmingham and Midland Free Hospital for Sick Children, the Birmingham and Midland Eye Hospital, the Birmingham and Midland Ear and Throat Hospital, the Birmingham Lying-in Charity, the Birmingham Royal Orthopaedic and Spinal Hospital, the Birmingham Skin and Urinary Hospital, the Midland Counties Home for Incurables, Leamington, and the Birmingham Medical Mission. He confirmed the gift of £10,000 to the University of Birmingham for general purposes, and directed the payment of any part of that sum that had not been paid already.

Scotland.

Central Midwives Board.

At a meeting of the Central Midwives Board for Scotland, held for the hearing of penal cases, with Dr. J. Haig Ferguson in the chair, a Glasgow midwife was found guilty of negligence and breaches of the rules while in attendance on two patients who died. Another midwife was charged with failure to notify a case of ophthalmia neonatorum, and, while in attendance on a patient who died, she was found guilty of negligence and breaches of the rules. In each case the Board found the charges proved, instructed the secretary to remove the name from the Roll of Midwives, and issued an order that she be prohibited from attending women in childbirth in any other capacity.

At the recent examination of the Central Midwives Board for Scotland, held simultaneously in Edinburgh, Glasgow, Dundee, and Aberdeen, 116 candidates appeared. Of this number 102 were successful and fourteen were rejected.

Defective Children.

The committee of the Council on Education in Scotland has amended the terms of certain articles of the regulations governing schools for the education of the blind, deaf-mute, mentally defective, or epileptic children. The most important amendment is to Article 2, which now reads as follows:

> Such institutions, schools, or classes must be specially reserved for children suffering from the same infirmity, and must be recognized by the Department for the purpose; but in the case of institutions for deaf-mute children the Department may sanction the admission of a limited number of hearing children on its being shown to their satisfaction that the admission of such children is beneficial to the education and general welfare of the deaf-mute children, and the expenses incurred on account of the number of hearing children so admitted shall reckon as part of the expenditure of the institution for the purpose of the grant under Article II of these regulations.

The training provided, while continuing instruction in general subjects, must be adapted to prepare the pupil for a trade or other means of livelihood. Except with the special approval of the Education Department not more than twenty pupils are to be enrolled in a class under one teacher.

Presentation to Dr. Henry Hay.

On the occasion of his resignation of the post of medical officer to H.M. prison, Edinburgh, after nearly thirty-six years' service, Dr. Henry Hay was presented by the staffs of the new and old prisons with a silver salver, as a token of their esteem. Dr. Hay, in returning thanks, said he valued very highly the expression of goodwill from the staffs. During his long period of service he had seen many changes, mostly for the better. He had known seven Commissioners, four Governors, over twelve chaplains, six head warders, and four matrons. There had been a great improvement in prison administration during that time, which had been responded to by the condition and behaviour of the prisoners. There was what he might call a good atmosphere in the prison, for which they were indebted to the staffs.

Glasgow Royal Infirmary.

The managers of the Glasgow Royal Infirmary have appointed John F. Fergus, M.A., M.D., F.R.F.P.S.G., to be an assistant physician, and Mr. James Taylor, F.R.C.S.Ed., an assistant surgeon to the institution.

Ireland.

Medical Certification for Sickness Benefits.

In connexion with the letter reproduced in this column of the Journal of November 12th, addressed to the Irish Medical Secretary, a deputation from the Irish Medical Committee, consisting of Dr. E. Magennis, Dr. R. J. Rowlette, Dr. T. Hennessy (Medical Secretary), and Mr. C. H. Gick (Secretary), waited recently on the Irish Insurance Commission, who had asked for an interview. Sir Joseph Glynn, chairman of the Irish Insurance Commission, explained that they had been instructed by His Majesty's Government, in common with other public departments, to take steps with a view to securing a reduction in the cost of expenditure on public services which are borne out of Exchequer funds.

The deputation, in their reply, dealt with the history of the certification grant in Ireland. They pointed out that, during the passage of the Insurance Act, to meet to some extent the demands of the medical profession in Great Britain the Government made a State or Imperial grant of 2s. 6d. per insured person over and above the ordinary State grant of two-ninths of the sickness benefit. Towards this grant Ireland had by way of Imperial taxation to contribute its full share, which, however, entitled it to an equivalent grant—that is, 2s. 6d. per insured person—which approximately amounted to the total of £94,693. When questioned in Parliament the then Chancellor of the Exchequer (Mr. Lloyd George) stated that the equivalent grant coming to Ireland could be used to meet the cost of medical certification for sickness benefits, for which purpose there was required a special fund owing to the deletion of medical benefits from the Insurance Act in its application to Ireland. The Treasury agreed to allow the Irish Insurance Commission to prepare a scheme for medical certification which could be financed on the limit of 2s. 6d. per insured person. The scheme, however, prepared by the Insurance Commission only made provision that a little more than half the available grant of £94,693

would be spent on medical certification. The profession contended, through their representatives, that the entire amount of the grant, according to the statement of the Chancellor of the Exchequer, was and should be made available for medical certification and should go to the medical attendants of the insured, who were the proper persons in the first instance to issue medical certificates for sickness benefits. The Insurance Commission, apparently as the result of pressure from some quarter, however, refused to spend more than £50,000 of the grant on medical certification. The profession declined to accept that sum, with the result that there arose a deadlock, to meet which the Irish Insurance Commission appointed a certain number of part-time certifiers who examined and issued certificates for insured persons without the co-operation or consent of their medical attendants. Medical practitioners who accepted service under the scheme were severely ostracized by their colleagues. The result was that the certification scheme broke down, and the Insurance Commission resumed negotiations with the Irish profession in the autumn of 1915, and an arrangement for certification, acceptable to the profession, came into force on January 1st, 1916. The bigger portion of the grant under the new scheme was to be paid for certification for sickness benefits to the medical attendants of the insured, and the residue was to be paid to the whole-time medical referees. The Treasury agreed to this scheme, but at a later stage refused to appoint the whole-time medical referees, on the ground that every possible doctor should be made available for the war medical services. When the war was over the Treasury found, on the grounds of economy, a further excuse for not appointing the whole-time medical referees. The Treasury never kept its side of the bargain, but it managed, whilst making the Irish taxpayers pay their full amount towards the administration of the Insurance Act in Great Britain, to get every year about half the original Irish equivalent grant returned unexpended to the Exchequer.

Arising out of the increased remuneration (40 per cent.) awarded to the panel doctors in Great Britain, the Irish Medical Committee applied to the Irish Insurance Commission for a substantial increase in the fees for medical certification. That application brought forth an offer of a 25 per cent. increase, which was declined by the Irish profession, with the result that they were ultimately offered 40 per cent., which was accepted and came into force as from January 1st, 1920. Notwithstanding the 40 per cent. increase in the fees for medical certification, there still found its way back to the Treasury each year a substantial unexpended sum of the pre-war equivalent grant which became available in 1913. It is estimated that, since the Insurance Act became operative in Ireland (now almost nine years ago), approximately a total sum of £250,000 of the equivalent grant has found its way back to the Treasury. This could not have happened if the Government had adhered to its arrangements with the Irish medical profession.

In the circumstances the deputation from the Irish Medical Committee refused to be a consenting party to any reduction in the remuneration for medical certification. It emphasized the fact that the recent increase was not only met by the pre-war equivalent grant, but a substantial residue from that grant still found its way back every year to the Treasury, and therefore the question of economy in the remuneration for medical certification in Ireland was on quite a different footing from the bonuses given to civil servants in other departments. The deputation further pointed out that the proposed reduction mainly affected Poor Law medical officials, whose salaries had been recently very much reduced owing to the Government having passed legislation which attached Irish health grants to meet the claims awarded mainly to Crown forces and others who were killed or injured in the rebellion. The legislation which diverted the health grants for the purposes stated also made provision for the further attachment of moneys raised by the local authorities to meet the cost of administration of the public medical services. As the result of the drastic legislation of the Government with regard to Irish health grants there were in several counties in Ireland medical officials who were some time ago in arrears with their salaries for eighteen months, and any they got was paid to them secretively by the local boards.

Correspondence.

CLAYDEN v. WOOD-HILL.

SIR,—This important medico-legal case, tried recently at the assizes at Bury St. Edmunds, has not, so far, been reported in your columns. Briefly stated, the facts were as follows:

The patient sustained a fracture of the femur just below the small trochanter, and was treated at Beccles Hospital by methods which were in accordance with the usual surgical teaching. She was not *x*-rayed, because the apparatus at Beccles was not good enough to enable an *x*-ray photograph of the upper part of the thigh and hip to be obtained. She left the hospital at the end of eight weeks walking on crutches, and, according to Dr. Wood-Hill's evidence and that of his partner, the fracture was then in a satisfactory position and the limb ½ in. short. About ten days after her return home the leg gave way under the body weight, and considerable pain and swelling occurred.

I saw the patient fourteen days after the incident, and operated upon the fracture four days later, finding the fracture united with angulation, the shortening being 1½ in.

The allegation of negligence was based upon:

(1) A wrong diagnosis of the level at which the fracture took place, due to (*a*) the absence of an *x*-ray examination, and (*b*) failure to examine and "set" the fracture under an anaesthetic. Unfortunately, Dr. Wood Hill had been induced to commit himself to a sketch showing the probable level of the fracture, in which he placed it too low down in the femur. (2) A failure to treat the limb in an abducted position as the result of the wrong diagnosis. As a result of this, plaintiff alleged that the fracture was malunited at the time she left Beccles.

The defence sought to prove:

(1) That the fracture was diagnosed as one of the upper third of the femur; (2) that the limb was kept abducted during treatment; (3) that the fracture was satisfactorily united without angulation and with only ½ in. of shortening at the time plaintiff left Beccles; (4) that the union subsequently gave way because the plaintiff put weight upon it contrary to Dr. Wood-Hill's advice.

Actually the result of the case depended largely upon the question whether a refracture had or had not occurred. I was asked whether at the operation I found evidence of refracture, and replied that I did not, but I pointed out that the interval between the giving way of the limb and the operation (eighteen days) was sufficient for signs of refracture to have disappeared. Apart from this, both judge and jury seem to have ignored the possibility of bending of the callus, a well-known and common incident in fracture of the femur, which I endeavoured to emphasize in my evidence. Counsel, in summing up, claimed that my evidence negatived refracture, and, on the strength of this, the evidence from the Beccles Hospital that the position of the bone was satisfactory when the plaintiff left the hospital was ignored or disbelieved.

Important lessons to be learnt from this case are that every case of fracture or possible fracture should be treated as a possible medico-legal one; that careful notes made at the time should be kept; that if an *x* ray is not taken, the reason should be stated in writing; and that practitioners should not commit themselves to statements or diagrams of the nature of an injury except on *x*-ray evidence. Apart from this, the medical profession must feel considerable perturbance at a legal decision which appears to place upon them responsibility for the result of their treatment apart from their acknowledged responsibility to use recognized methods and to use them carefully, for it would appear that the mere fact that the result of the treatment of the fracture was unsuccessful was accepted as a sufficient cause of action. This seems to suggest an entirely new aspect of medical responsibility.—I am, etc.,

London, W., Nov. 21st. R. C. ELMSLIE.

*** A full summary of the report of this case appears in our medico-legal column this week, at p. 919. Mr. Elmslie's letter strengthens us in the belief that Dr. Wood-Hill, if an appeal has been decided on, would be supported by the general opinion of his profession.

MENTAL TREATMENT OF EX-SERVICE MEN.

SIR,—In the last number of the JOURNAL a full report is given of questions asked in the House of Commons by Captain Loseby, with the replies of Mr. Ian Macpherson, on the above subject.

It may, perhaps, be of interest to your readers to quote from a letter written by Captain Loseby which appeared in the *Times* of November 9th, 1921. One paragraph reads as follows:

"According to official returns, lunatic asylums during the past three years have held in bondage—necessarily or otherwise—the following ex-soldiers—men who, had it not been for their service, would to-day be free and happy."

My experience is that in a large number of these cases it is very doubtful, to say the least, if service in the forces was the cause of the insanity. The officers of the Ministry of Pensions, out of the kindness of their hearts, often decide that the illness was "attributable" to service, but most experts would agree that in many cases it was one of the least of the factors which led to the final breakdown. The truth is that a large number of these men should never have been passed as medically fit for the army. Captain Loseby uses the word "service" and does not state "war service," but I feel sure that most readers of this letter will conjure before their minds the picture of men driven insane by the horrors of fighting in the trenches. The fact is that large numbers of "service" patients never left England during the war. I think if Captain Loseby were to put a question in the House asking for the exact figures on this point he would be surprised.

Dr. William Robinson read a very interesting paper on the subject before the Medico-Psychological Association, and this appears in the *Journal of Mental Science*, January, 1921. Out of 140 service patients 49, or 35 per cent., never left the United Kingdom, and of these 49 in one case only was the mental disorder due to the stress of military training. Of the 140 half were cases of congenital mental deficiency. I would like to quote his summary and conclusions in full, but must content myself with one paragraph only:

"It is impossible to arrive at any other opinion than that the service patients, as a class, would, as regards the majority, have been patients in mental hospitals sooner or later had there been no war. As regards the minority, they would probably have constituted the pre-war groups of waifs and strays, and formed the inhabitants of the casual wards of workhouses and the inmates of civil prisons."

There are several other points in Captain Loseby's letter which could be criticized, but I do not wish to divert attention from the above points. The suggestion that men are "held in bondage" in "asylums," possibly "needlessly," is best left unanswered.—I am, etc.,

R. H. STEEN, M.D., F.R.C.P.

City of London Mental Hospital,
Dartford, Kent, Nov. 21st.

PERFORATION OF THE NASAL SEPTUM IN COCAINE TAKERS.

SIR,—The remarks made by Professor Dixon on the cocaine habit, reported in the BRITISH MEDICAL JOURNAL of November 19th (p. 821), induce me to call attention to the fact that, owing to the difficulties now imposed upon cocaine takers by the activities of the police, quite a number of persons is now to be met with suffering, though unavowedly, from deprivation of the favoured *coco*, or *prise de blanc*.

Such persons usually come before their doctors as obvious neurasthenics, and detection of their special and carefully concealed proclivities is not always easy.

In one case recently admitted to my wards the diagnosis of "cocaine habit" was made, I believe perfectly correctly, by the recognition of the peculiar circular perforation of the cartilaginous nasal septum that has been described in America and on the Continent. The perforation in this particular case had been regarded as syphilitic by several competent medical men. It certainly was not so.

The perforated septum, which is relatively so frequent amongst confirmed cocaine takers, is, of course, only seen in those who take the drug as snuff—a method which, with all deference to Professor Dixon, is, I believe, far more popular than that of hypodermic injection.

This opinion is also that of Dr. Cramer (of Geneva), who has devoted much curious attention to the subject, and who last week gave a masterly exposition of it before the Medical Society of Geneva.

It would appear that at Geneva the cocaine habit has recently extended to an alarming extent, and Dr. Cramer tells me that official information from London points to a recent recrudescence of activity amongst our own traffickers in the drug. Abroad the diagnostic importance of the nasal perforation is perhaps better appreciated than, so far as I can find, is the case in London.—I am, etc.,

London, W., Nov. 19th. F. G. CROOKSHANK.

ERYTHEMA NODOSUM.

SIR,—From Dr. Gosse's letter in your issue of November 12th it is evident that in my paper on erythema nodosum as an acute specific fever I did not sufficiently emphasize the fact that this view is by no means a new one. Dr. A. A. Lendon published his well known book in 1905, under the title, *Nodal Fever (Febris Nodosa)—Synonyms: Erythema Nodosum, Erythema Multiforme*, and in his introduction he says "that the general behaviour of this disease suggests, and is in every way consistent with, the theory that it is in reality an acute specific infectious fever, and not merely an affection of the skin."—I am, etc.,

Clifton, Nov. 11th. J. O. SYMES.

SIR,—I was much struck, when house-physician twenty years ago, by the association of this disease with acute rheumatism in children, and have come across ample clinical evidence of this in private practice since. May I quote one out of other similar cases? D. G., aged three years, developed erythema nodosum, the diagnosis being confirmed by my old chief, Dr. W. B. Cheadle. I have watched this child for the last fifteen years, and seen her develop typical rheumatic endocarditis followed by a chronic double mitral murmur, duly compensated. At another period of her childhood she had an acute attack of rheumatism of the hip-joints.

It might be argued that the case was not rheumatic; but the development of mitral disease, indistinguishable from what one regards as a common manifestation of rheumatic disease in childhood, and proved so by the experiments of Poynton and Paine, certainly points to erythema nodosum being a form of acute rheumatism, and not a separate entity.—I am, etc.,

London, N.W., Nov. 21st. H. J. VAN PRAAGH.

SIR,—I have long believed that erythema nodosum is not of rheumatic origin for the following reasons:

1. It does not occur as an "alternative" manifestation in obviously rheumatic patients.
2. Its presence is not accompanied by the typical rheumatic signs.
3. It is uninfluenced by salicylate treatment.
4. It is always cured by the administration of calcium chloride associated with local sedatives and rest.

—I am, etc.,

Sheffield, Nov. 20th. HERBERT HALLAM.

NATIONAL PROVIDENT HOSPITAL ORGANIZATION (SUSSEX SCHEME).

SIR,—I hope you will admit a brief reply to Dr. Muir Smith's letter in your issue of November 19th, in which he has courteously supplied figures in regard to fees paid by panel patients, which figures, of course, I accept without question.

First, may I make a correction? He is right in saying that this provident scheme was originated by a public-spirited physician, but wrong in supposing that it has received the "whole-hearted" support of the staffs of the various hospitals concerned.

Secondly, his figures bear out my contention that some scheme of relief to people with small incomes is demanded.

Take the case which he quotes of a man with £2 10s. a week—that is, £130 a year—who paid £39 18s. for an operation and three weeks in a nursing home. This man was required to pay considerably over a quarter, and within £3 6s. 8d. of one-third, of his whole annual income. I remain unconvinced that patients in such a financial position should be asked to pay such fees, or that medical men should be willing to accept them, still less expect them.

I am sorry to differ from Dr. Muir Smith in this matter. We have hitherto agreed, I think, upon most subjects whenever I have had the pleasure of meeting him.—I am, etc.,

Brighton, Nov. 21st. ROBERT SANDERSON.

ILIO-TIBIAL BAND GRAFTS FOR THE RADICAL CURE OF LARGE INGUINAL HERNIAE.

SIR,—Mr. Hume's article on this subject (November 19th, p. 824) raises the following points:

What is the prognosis as regards radical cure of inguinal hernia by—

1. Removal of sac;
2. Removal of sac—insertion of deep sutures;
3. Removal of sac—the use of some kind of "overlapping" method;
4. Removal of sac—the insertion of a filigree;
5. Removal of sac—autogenous fascial graft?

At the present day we require to know the actual figures (years of cure with mean variation) for these operations for a patient of any given age and showing—

X. A degree of bulging of the abdominal wall, taking into account the factors of muscular development and degree of distension by the abdominal contents.

Y. Size of sac.

Mr. Hume has stated the size of the sacs and the degree of muscular development, and both were in common estimation eminently unfavourable. But the mere removal of a large sac may work wonders with the mechanics of the inguinal canal.

Now it is common practice throughout the country to operate on patients with large inguinal herniae, much larger than were done, except for urgent reasons, twenty years ago, and at more advanced ages. The general opinion is that the results are good. But how good are they? With a common condition of this kind we ought not to be satisfied until we can give the patient a definite mathematical answer such as ought to be forthcoming from surgeons whose practice lies that way. It is their debt to the profession.—I am, etc.,

Aberdeen, Nov. 19th. G. H. COLT, F.R.C.S.

IMMEDIATE OPERATION IN PENETRATING WOUNDS OF THE ABDOMEN.

SIR,—Dr. Pearson, reporting a case under the above heading in the JOURNAL of November 5th (p. 747), emphasizes the importance of very early operation in penetrating wounds of the abdomen, but he does not, I think, sufficiently indicate the reason.

The importance lies in the fact that some of these cases are bleeding badly owing to severance of blood vessels in the abdomen, and will die within a few minutes to an hour or two if the haemorrhage be not stopped.

It is comparatively rarely, as Dr. Pearson surmises, that one gets the opportunity of operating on such cases within a few minutes of the accident, but such opportunities occurred fairly frequently under the unusual conditions of the siege at Kut el Amara, where, as I described in the JOURNAL in 1917,[1] cases were often received very shortly after they were hit. Recognizing the importance of operating at once on bleeding cases, we kept the operating theatre in a state of absolute readiness, and such cases as were suspected of internal haemorrhage were subjected to immediate operation, with the result that some of them were saved.

It is not, however, every case of penetrating abdominal wound that should be so treated, for there is the question of shock to be considered; and if one can feel reasonably sure that the patient is not bleeding seriously, it is often better to wait a little before adding to the shock already sustained by the victim of the injury.—I am, etc.,

CHARLES H. BARBER,
Montfermeil, France, Nov. 14th. Major I.M.S.

IMMEDIATE TREATMENT OF DIPHTHERIA.

SIR,—A short time ago a medical practitioner complained in the columns of your journal that he not only had difficulty in obtaining from a sanitary authority antitoxin for the immediate treatment of a case of diphtheria, but was afterwards charged for the serum by the medical officer of health (instructed by his council). My district, on the contrary, has for twenty-five years not only supplied antitoxin free of charge but also arranges for bacteriological examination of throat swabs.

The latest mortality returns from this disease are—

Before antitoxin was used	30.39	per cent.
When antitoxin is given in sufficient quantity:		
On the first day of disease... ...	0.0	,,
On the second day of disease ...	4.2	,,
On the third day of disease ...	7.0	,,
On the fourth day of disease ...	11.5	,,

The necessity for immediate treatment is self-evident. The deaths of two children from delayed treatment, due to absolutely accidental circumstances, has induced this council, on my recommendation, to further facilitate the immediate treatment of the disease by placing at four convenient points in the district a diphtheria outfit, containing one sterilized syringe and 4,000 units of antitoxin. This is for the free use of every medical practitioner practising in the district, that each may, day or night, have available the means of immediate treatment of this disease.

I gave my first antitoxin injection thirty years ago and am a strong advocate for large initial doses.—I am, etc.,

RASHELL DAVISON, M.D.,
November 20th. M.O.H. The Maldens and Coombe.

MEDICAL BOOK CLUBS.

SIR,—My attention has been drawn to a letter in your issue of October 8th from Dr. Eric Bayley, claiming that the City of London Medical Book Society is the oldest in the kingdom, having been founded in 1821. May I be allowed to point out that the Medical Reading Society of Bristol was founded in March, 1807, and has had a continuous existence ever since. In the September number of the *Bristol Medico-Chirurgical Journal* for 1907 there is an interesting article on its history from the pen of Mr. L. M. Griffiths.

The number of members is limited to twelve. We meet on the first Wednesday in every month, and there is a fine of 1s. inflicted on members who do not arrive by 9 p.m. and of 2s. if they fail to come by 9.30. There are also the usual fines for keeping books and periodicals beyond the allotted time. A sale is held at the first meeting in the year, and on this occasion it was the custom until the war to have an annual dinner. At our ordinary meetings, however, there are always some refreshments—"a neat repast, light and choice, of Attic taste, with wine"—"whence we may rise" all the better for our pleasant social gathering, agreeing with Milton that—

> "He who of those delights can judge, and spare
> To interpose them oft, is not unwise."

—I am, etc.,

Clifton, Bristol, Nov. 17th. W. A. SMITH.

MOTOR CARS: SPARE PARTS.

SIR,—Dr. Lionel Stretton has written a much-needed warning on this subject (p. 868), but I go further and warn my brother medicos against dealing with firms that cannot supply spare parts at all.

Only last week, on applying for spares to the London agent for an excellent French car, I was disgusted to receive a wire, "Regret cannot supply parts."

I have written to them and pointed out that, however excellent a car is, it is useless unless one can replace parts, and that in future I shall be unable to recommend their cars.

The local garage manager informs me he has the same difficulty with all makes except the Americans. Is it anything to be wondered at that our makers are given the "go-by"?—I am, etc.,

GEORGE P. BLETCHLY, M.B.Lond.
Nailsworth, Gloucestershire, Nov. 19th.

VENEREAL CLINICS: A LAY POINT OF VIEW.

SIR,—It is with hesitation that I write to your paper of venereal disease from the patient's point of view, but that is a point of view that I have not seen put forward. Your paper is read by many more people who are not medical men than the medical profession realizes. And that is because at the present time it is the only means known to many laymen by which they can follow the

[1] BRITISH MEDICAL JOURNAL, January 6th and February 17th, 1917; *Lancet* January 20th, 1917, "Gunshot Wounds of the Abdomen."

efforts of the Ministry of Health to deal with venereal disease. The accounts in daily papers are useless and misleading.

It must be quite obvious that, if 10 per cent. of city populations have syphilis, and probably more than half have or have had gonorrhoea, more than half our male population, at any rate, are venereals. To those people who would damn us as social outcasts the retort is obvious—it is ridiculous to maintain that half our male population are blackguards. They are not, but are merely average young men.

Of those people among whom I live in the suburbs of London the vast majority are as regular in their illicit sexual intercourse as they are in their football and cricket. And all of us know that our friends have promiscuous intercourse, but we do not damn them until they acquire venereal disease; then they are social outcasts. Sexual intercourse is condoned, but venereal disease is not. That is a curious attitude of society.

Now the majority of young men in suburban London are quite decent-living, law-abiding, and hard-working citizens, but they regard sexual intercourse as a normal enjoyment to which they are entitled. To address us from the moral aspect is waste of time—we do not consider it immoral—but we are fully alive to the terrible dangers of venereal disease to us and to the State.

The next point, and a vital one, is that of treatment. We do not go to our family doctors—we prefer to attend a stranger. Many of us are cured, but many are given a syringe to take home with a bottle of medicine. Many of these go through the tortures of the damned. We are not told of the splendid venereal clinics at the London hospitals; we do not know that we can go there, as we always consider the hospitals as institutions for the indigent. It is by accident the discovery is made—usually from a friend. And what a godsend they are! My personal experience of that at St. Thomas's Hospital was a revelation—kindness, sympathy, and efficiency, with new hope and returning health. And yet so few know of it. Why is it not advertised? Why are we not told? Where are the notices in public urinals that we have heard of but never seen?—I am, etc.,

November 4th. VENEREALEE.

The Services.

WAR EMERGENCY FUND.

A GENERAL meeting of the members of the War Emergency Fund will be held in the rooms of the Medical Society of London at 11, Chandos Street, Cavendish Square, London, W.1, at 5 p.m., on Wednesday, December 7th. A report of the work of the Fund since its inception in 1916 will be presented, and the scope for its usefulness in the next few years will be outlined. It is hoped that on this occasion there will be a large and representative meeting of the subscribers, who are asked to accept this as the notice of invitation.

THE No. 55 General Hospital second reunion dinner (postponed from last May) will be held on December 8th, at 7 p.m. for 7.30 p.m., at Princes' Restaurant, Piccadilly. Old officers wishing to attend should communicate with Dr. H. B. Roderick, 17, Trumpington Street, Cambridge.

The reunion dinner of the 50th Northumbrian Division, T.A., R.A.M.C., will be held at the Central Station Hotel, Newcastle-on-Tyne, on Thursday, December 22nd, 1921, or January 12th, 1922, as proves more convenient. Officers of the R.A.M.C. who served with the Division in France, and who wish to attend, are asked to notify Dr. E. S. Simpson (Mental Hospital, Beverley) before December 8th, intimating which date is more suitable, and also stating whether they desire a bedroom reserved on the night of the dinner.

THE *London Gazette* of November 3rd, 1921, announces the retirement of Lieut.-Colonel H. E. Rowell, M.D., T.D., of the Fifth Battalion Norfolk Regiment, Territorial Army Reserve (Infantry), after serving as a combatant officer for over twenty-five years in the Volunteers and Territorial Army. He retains the rank of lieutenant-colonel, with permission to wear the prescribed uniform, and has received a letter from the Army Council thanking him for his services to the Territorial Force.

THE petition of Dr. August Wittenborg, professor of anatomy in the University of Tennessee, for nationalization in the United States has been refused on account of his failure to register for service in the war. Dr. Wittenborg, who had been domiciled in the United States for many years, is a German by birth.

Medico-Legal.

CLAYDEN v. WOOD-HILL.

An Action for Negligence.

AT the last Suffolk assizes at Bury St. Edmunds, before Mr. Justice Bailhache and a special jury, a case was heard of the utmost importance to general practitioners. Mr. and Mrs. Clayden, of Radlett, brought an action to recover damages from Dr. H. G. Wood-Hill, of Beccles, for alleged negligence in his medical treatment of Mrs. Clayden. The defendant counter-claimed for damages for alleged libel. The account that follows is abstracted from reports in the *East Anglian Daily Times*.

Sir E. Marshall-Hall, in opening for the plaintiff, remarked that it was a very serious and important case from the public point of view, because it involved the duty of a doctor towards a patient whom he had undertaken to attend. The facts of the case, according to counsel, were that in September, 1920, Mrs. Clayden, while on a visit in Suffolk, was driving in a dogcart, when the horse upset the cart, and she was thrown into the road. While Dr. Wood-Hill was being fetched from Beccles, Miss Clowes, who had been a hospital nurse, came along and had Mrs. Clayden conveyed on a milk float to her house. She was overtaken by Dr. Wood-Hill, who applied sandbags to the leg to keep it steady. A bed was prepared and everything possible done for Mrs. Clayden's comfort. Dr. Wood-Hill, who had served in the war and was highly respected in the district, examined the lady when she was in bed, but without administering any anaesthetic or opiate. He then suggested to Miss Clowes that there was a fracture of the femur, "somewhere about the middle upper third." Mrs. Clayden complained of pain in the buttocks and back, and there was a good deal of swelling at the top of the thigh. Dr. Wood-Hill, however, did not give any direction for abduction of the leg. As there was difficulty in nursing her at the house he suggested her removal to Beccles Hospital, to which he was attached as surgeon. Mr. Clayden agreed, and on September 22nd she was taken by motor ambulance to the hospital as a paying patient. Dr. Wood-Hill put a Thomas splint on the injured limb, but this was later substituted by a Hodgen splint. Counsel claimed that the shortening of 1 or 1½ inches that followed was evidence of negligence, as it showed something more than a simple fracture, and he alleged negligence in that the aid of the *x* rays was not called in. It was stated that the installation at Beccles Hospital was of weak power; but there were hospitals with efficient *x*-ray apparatus at Norwich, Lowestoft, Yarmouth, etc., and an efficient radiograph could even have been brought to Beccles. Describing the subsequent course of the case, counsel called attention to the pain complained of by Mrs. Clayden, but to which, he alleged, no attention was paid by the defendant. On November 12th, Dr. Wood-Hill said that she could go home next day, as she was quite fit. She was taken home by train, and her husband wrote to the defendant enclosing his cheque and thanking him for the great kindness and ability with which he had treated his wife, and the kindness she had received in hospital. On November 22nd Mrs. Clayden's leg suddenly gave way. She went to bed, and her husband later called in Dr. Cooper, the local doctor, who ordered her removal to St. Albans Hospital for *x*-ray examination. In the meanwhile Mr. Clayden sent a sketch to Dr. Wood-Hill, asking him to mark the spot at which he had diagnosed the fracture, and he returned it marked in the middle of the upper third of the femur. The *x*-ray examination revealed that the fracture was in the neck of the femur. Thereupon Mrs. Clayden was removed to the Freemasons' Hospital, where she underwent the operation of cutting down to the fracture. It was found that the alignment was 30 degrees out of the straight. She remained there four months, and left practically cured, the leg having nearly regained its normal length.

After Mr. and Mrs. Clayden had given evidence in support of counsel's statement, and been cross-examined by Sir Ernest Wild, Dr. Edward Cooper of Radlett described the results of his examination of the patient's leg when she arrived home after leaving Beccles Hospital. He found 1¾ in. shortening; there was no sign of any new fracture. Had the operation not been done she would have been permanently lame. It was most important, he said, that the exact position of the fracture should be diagnosed, and essential that the *x* rays should be used. In reply to Sir E. Marshall-Hall, he agreed that a skilful man should have diagnosed the fracture as in the region of the neck of the femur.

Mr. R. C. Elmslie, orthopaedic surgeon to St. Bartholomew's Hospital, said he saw Mrs. Clayden at the Freemasons

Hospital, and was shown a radiograph of the fracture. He found the leg about 1½ inches short, and there was some angulation. He advised an operation, which involved cutting down to the bone and the keeping of the patient a long time in bed. He described the state of the fracture which he found at operation; he saw no evidence then of a second fracture. He thought it possible to have perfectly good results without the use of *x* rays, although he did not think it was desirable to dispense with them from a surgeon's point of view. In the course of cross-examination, he said that if he found a good alignment and extension he would not trouble to send a patient 10 or 15 miles by road to a hospital for *x*-ray examination. In reply to the judge, he said that fractures of the upper third of the femur were very difficult ones. Re-examined, Mr. Elmslie is reported to have said that if he had upon diagnosis found the fracture as it was ultimately found he could have dealt with the case without operative treatment.

Mr. H. F. Dickens, opening the case for defendant, said that a charge of this kind, if proved, meant practical ruin to a medical man. He claimed that it had been shown that Dr. Wood-Hill exercised every care and ability, and everyone was satisfied until the occurrence of November 22nd, when Mrs. Clayden's leg broke down.

Dr. Wood-Hill gave evidence as to his treatment of the case, the opinions he formed, and the advice he gave. After the patient's removal to Beccles Hospital the *x*-ray apparatus was not strong enough for use. He adopted abduction of the leg. Dr. Fox saw the patient, and they came to the conclusion that an anaesthetic should not be given because the swelling was so enormous with considerable haemorrhage. The swelling subsided in about a fortnight. He took the splint away about four weeks afterwards and examined the leg, and found that union had already taken place. Extension was continued, but the abduction was reduced. On October 28th, before taking away the weight, he measured the limb with a tape and found that it was half an inch short. Advice as to what she was to do on leaving hospital was given to Mrs. Clayden many times while she was in hospital. It was collected and given to her the day before she left the hospital, so that she should not leave without a clear view of what she was expected to do. He advised her to have a bedroom on the ground floor; not to bear weight on the leg; to use crutches and not substitute sticks; to exercise the knee; and he showed her how to use the muscles of the limb. He impressed upon her that after she left the hospital it was for her to carry out the directions of her own doctor. He did not look upon her as cured, but as anxious to return home, and he thought it reasonably safe for her to do so. He told her on one occasion, when she hopped down the ward on her sound leg before he could stop her, that her leg was not ready to bear her weight. He told the husband on November 13th what Mrs. Clayden was to do when she was taken home, and drew his attention to the necessity for carrying out the instructions he had given.

Dr. G. R. Fox, partner of the defendant, bore out Dr. Wood-Hill's evidence. He added that it was a great grievance that there was not an efficient *x*-ray installation at Beccles Hospital. His Lordship expressed his opinion that this question of the *x* ray was of little importance in view of the evidence.

Miss Clowes, who saw Mrs. Clayden shortly after the accident and put her to bed, said that Dr. Wood-Hill diagnosed the fracture as in the upper third of the femur; in her opinion there was no need for an anaesthetic; when the patient was in hospital the leg was abducted, the weight being on the side of the bed. The matron of the Beccles Hospital said that Dr. Wood-Hill told her Mrs. Clayden was suffering from fracture of the upper third of the femur and indicated it to her. When the leg was put in a splint it was abducted with a weight at the side of the bed; this was properly done. She confirmed the defendant's statement as to the instructions he gave to Mrs. Clayden when she left hospital. Mrs. Clayden did not seem to like the idea of using crutches. This evidence was borne out by Miss O'Connor, a nurse, and Miss Crisp, a probationer at Beccles Hospital. Further evidence of nurses was dispensed with by the jury at the judge's suggestion.

Sir Hamilton Ballance, surgeon to the Norwich Hospital, said that Dr. Wood-Hill in his diagnosis was correct in placing the injury at the upper third of the femur. An anaesthetic was advisable in certain fractures and not in others; he had set many fractures of the femur without an anaesthetic; it must rest with the discretion of the surgeon in charge. In the use of an anaesthetic there was struggling which could not be avoided, and it increased the damage round the fracture. It was a common practice at Norwich Hospital at the end of seven or eight weeks for the limb to be taken out of splints and the patient sent out on crutches. A measurement of only half an inch shortening was a satisfactory result. Witness told the judge that lateral deformity could not always be prevented; a good deal could certainly be done to prevent shortening. Asked by Sir Ernest Wild if, in his view, defendant treated that case properly, he replied: "It is the way I should have treated it."

Mr. H. E. Griffiths, chief assistant in the surgical department at St. Bartholomew's Hospital, said that during the war he had enormous experience of femur fractures, as many as 300 cases were under him at a time. From what he was able to gather of the evidence he thought there was no possible doubt that in this case there was a separation of the original fractured fragments of the femur. Acute bending of the femur after fracture was so far unknown. In cross-examination he said he thought that Dr. Wood-Hill did everything reasonably necessary.

Mr. Harold Wilson, surgeon to St. Bartholomew's Hospital, said he found himself in general agreement with the two previous witnesses; he believed it to be a case of refracture. Sir Hamilton Ballance, recalled by the judge, and asked whether, had there been a fair union, he would have expected it to give way in the circumstances related by Mrs. Clayden, replied that he thought the union had been weakened by the weight she put upon it during the previous two or three weeks.

Sir Ernest Wild having addressed the jury for the defendant and Sir E. Marshall Hall for the plaintiff, the judge summed up. Having reviewed the evidence at length and described the importance of the case, his Lordship said that it ultimately came to whether the jury could believe Mrs. Clayden and her husband and Nurse Willimott [one of the Beccles Hospital nurses] as to the treatment the plaintiff received in the hospital. If the leg was abducted it would seem to be quite clear that Dr. Wood-Hill had diagnosed a fracture in the upper third of the femur; if he did and the leg was abducted, then his diagnosis and treatment were perfectly right; if her leg was not abducted but was laid straight out (as she and her husband said) it seemed equally clear that he did not diagnose a fracture in the upper third of the femur, because if he had he would have abducted the leg. Against their evidence was that of Dr. Wood-Hill, Dr. Fox, the matron and the nurses, with the exception of Nurse Willimott, of Beccles Hospital. If the jury concluded that he had accurately diagnosed and properly treated the case the only remaining question was whether, on her leaving, the defendant gave her necessary instructions as to her future behaviour. Mrs. Clayden had crutches; the custom varied, some doctors gave crutches and others gave calliper splints; there was no negligence there. If he (the judge) had himself to decide the case he would consider and try to find out what happened on November 22nd. If a refracture took place, then it was very doubtful whether the plaintiff had made out her case—very doubtful indeed. But if it was not a refracture, he would consider very carefully the alternative view.

The jury, after twenty-five minutes' retirement, returned a verdict for the plaintiff with £600 damages, and judgement was entered accordingly; also £150 damages to Mr. Clayden, this being an agreed sum in the event of a verdict for the plaintiff—£750 in all. The counter claim was dismissed without costs to either side.

Further reference to this case will be found in our correspondence columns this week, at p. 916.

Obituary.

PETER THOMPSON, M.D.,
Professor of Anatomy, Birmingham University.

WE much regret to announce the death, at Penmaenmawr, of Dr. Peter Thompson, professor of anatomy in the University of Birmingham, and Dean of the Faculty of Medicine, at the age of 50. Professor Thompson received his medical education at Owens College, Manchester. He graduated M.B., Ch.B.Vict. in 1894, and M.D. in 1899, being awarded a gold medal for his M.D. thesis. He made many important contributions to the subject of anatomy, particularly in embryology, and an account of his scientific career is given below. He was a member of the Central Division of the Birmingham Branch of the British Medical Association; and in the Section of Anatomy and Physiology at the annual meetings of the Association at Manchester (1902), Belfast (1909), and Birmingham (1911) he was respectively secretary, vice-president, and president. He was also vice-president of the Section of Medical Education at the annual meeting at Cambridge in 1920.

We are indebted to Professor WILLIAM WRIGHT for the following appreciation:

The intimation of the death of Professor Peter Thompson must have come to many members of the profession with all the suddenness and solemnity of the first peal of a passing bell. When I first knew Thompson, some twenty-

two years ago, he was senior demonstrator of anatomy in Owens College, Manchester, a man of powerful frame and striking personality, able, forceful, and enthusiastic. No gifts of prescience were required to foretell for him a successful and brilliant career. While in Manchester he published an important work on the myology of the pelvic floor, for which he was awarded a gold medal and the degree of doctor of medicine. The work has stood the test of time, for, although various anatomists have in the intervening years continued investigations into the anatomy of this region, they have found little, if anything, either to add or to correct. After some years spent in Manchester, Thompson came to London as lecturer on anatomy at the Middlesex Hospital Medical School, where he extended and confirmed his already high reputation as an anatomist. From the Middlesex Hospital he passed in 1905 to the chair of anatomy at King's College, and when there began to take a closer and keener interest in the embryological side of his subject—an interest which was further quickened by a prolonged visit to Germany, and by work in Professor Keibel's laboratory in the University of Freiburg. While in Germany he made from serial sections a reconstruction of a human embryo of twenty-three paired somites, and on his return to this country became a leading and enthusiastic exponent of the wax-plate method of reconstruction. In embryology he studied particularly the development of the brain, and of that central region which includes the heart, pericardium, diaphragm, and liver. He produced in 1909, in collaboration with Mr. S. Ritson, a model of the brain of a 20 mm. foetal cat, and in 1910 delivered an Arris and Gale Lecture at the Royal College of Surgeons on the development of the heart, using for his purpose a 1.5 mm. human embryo.

In 1909 he left King's College to occupy the chair of anatomy in the University of Birmingham, in succession to Professor Arthur Robinson. In Birmingham he continued his embryological investigations, and edited in 1915 an important volume, *Studies in Anatomy from the Anatomical Department of Birmingham University*. His research work became, however, more and more interrupted as his health, somewhat indifferent even in London, became more and more precarious. Railway journeys and attendances at meetings were hazardous if not actually harmful, and he was seen less and less at meetings of the Anatomical and other scientific societies. Few, however, were aware that there had been any exacerbation of his illness, and few were prepared for the fateful news that he was no longer to be met in "the cheerful ways of men." *Eripitur persona, manet res* is a truth which can never be sure of anything but a chilly reception, mortals though we know ourselves to be. Still, there is some consolation when what does remain is so substantial and important as are Thompson's contributions to the subject of anatomy, contributions which will be of undoubted assistance to all who hereafter shall work in the same fields, contributions which will ever be a credit to the English anatomical school.

Perhaps Thompson's most striking mental characteristic was his enthusiasm; he could make what are frequently referred to as the cold facts of anatomy glow at times with quite unwonted splendour, and could attach to a simple descriptive statement some of the attributes of high discovery. It was this power, coupled with his unusual gift of clear exposition, which made him so impressive and stimulating a lecturer. He was singularly effective in all he did and said; his mind and hands and tongue kept ever the closest company, to a degree not a little perplexing to some of us who find this happy accord so difficult to attain. His enthusiasm was also shown in the whole-hearted fashion with which he identified himself with the various institutions with which he was associated. He was chairman of the London Old Owensian Society, Sub-Dean of the Middlesex Hospital Medical School, Dean of King's College (medical section), and Dean of the Faculty of Medicine in the University of Birmingham. He kept up his connexion with all and had warm and affectionate friends in each. By a sad coincidence the annual meeting of the Anatomical Society, which he had served as honorary secretary, honorary treasurer and vice-president, was held on the very day on which the notice of his death appeared, and expressions of affection and regret were heard on all sides. So passes from our midst one who in his relatively short life achieved much, one who, we venture to say, had he been freed from those alternating hopes and fears which in later years were so distressingly his lot, would have won for himself a foremost place not merely among British anatomists, but among anatomists of all countries.

A message of condolence has been sent from the Anatomical Society to his widow and children, but the sympathy of a much larger circle is assuredly theirs—the sympathy of all those trained in Manchester, London, and Birmingham who had the advantage of knowing him, and who will always esteem it a privilege and an honour that their first steps along the ancient *via Hippocratica* were guided by one so genial, so thorough, so unaffectedly interested in their welfare. *Ave atque vale.*

SHERIDAN DELÉPINE, M.Sc., M.B.,

Professor of Public Health and Bacteriology, Manchester.

We mentioned last week with great regret the death of Professor Sheridan Delépine of Manchester, which took place on November 13th at his house in Withington. He was born on January 1st, 1855, the son of Antoine Delépine of Paris and Henriette Mennet, a Swiss lady. He received his education at the Collège Charlemagne, the Académie at Lausanne, and the University of Geneva, where he graduated B.Sc. in 1872. His medical education was obtained in the University of Edinburgh, where he graduated M.B., C.M. with first-class honours in 1882. He received the M.Sc. from the University of Manchester in 1905. Soon after graduation at Edinburgh he went to London and became private pathological assistant to the late Sir Andrew Clark, then at the zenith of his fame. Delépine was appointed lecturer in physiology, and afterwards in pathology, at the St. George's Hospital Medical School.

In 1891, when the University of Manchester was, by the gift of £6,000 from Mr. Daniel Procter, enabled to endow a full time chair of pathology, Delépine was elected Procter professor of pathology and morbid anatomy. He had to organize the department and establish a bacteriological laboratory. At that time the professor of pathology was not a member of the staff of the Manchester Royal Infirmary, but Delépine by his geniality and enthusiasm was able largely to overcome this difficulty. From the time he got the bacteriological laboratory into working order he began to do work for the public health authorities of Manchester, Salford, and many other districts; gradually he became more and more absorbed in bacteriology and public health work, and when the University determined to establish a chair of public health and bacteriology and to erect a public health department, Delépine accepted that chair and became director of the department. Here practical classes for medical men desiring to obtain the diploma in public health were instituted, here routine work was done for the local public health authorities, and here Delépine himself carried on numerous researches. He gave much attention to questions concerning the control of the milk supply and the production of pure clean milk, and in particular to the means of preventing the conveyance of tuberculosis from infected cows to man; upon this subject he produced several reports and monographs. He also wrote upon the bearing of outbreaks of food poisoning, on the etiology of summer diarrhoea, on the purification of water, and on chemical disinfectants.

Professor Delépine was a member of the Manchester Division of the British Medical Association. He was secretary of the Section of Pathology and Bacteriology of the Annual Meeting in Birmingham in 1890, vice-president and president respectively of the same section of the Annual Meetings of the Association at Nottingham in 1892 and Carlisle in 1896. He was also president of the Section of Bacteriology at the Annual Meeting in Manchester in 1902.

At a special meeting of the Senate of the University of Manchester on November 16th the following resolution was unanimously adopted:

> The Senate desires to express its deep sorrow at the death of Professor Sheridan Delépine, and to place on record its high appreciation of the distinguished services he rendered to the University and to the sciences of pathology, bacteriology, and preventive medicine. During thirty years of strenuous work as a professor of this University he firmly established the position of pathology in the medical school, he made valuable contributions to medical science, and, by the unstinted labours which he devoted to the organization and development of the Public Health Department, he conferred lasting benefit upon the community.

During the war Professor Delépine did much work for the military forces in connexion with subjects to which he had given special attention. He married an English lady and is survived by one daughter. His last years were overshadowed by the death of his only son during the war. He leaves many friends who will miss his personal sympathy and his eager enthusiasm for all applications of scientific knowledge and scientific methods to medicine.

WE regret to record the death from pneumonia of Colonel EDWARD ST. BARBE SLADEN, which occurred on November 9th, at Tunbridge Wells, in his 60th year. The son of the late Colonel Sir Edward Sladen, Edward Sladen was born in Upper Burma, and was educated at Wellington College, Caius College, Cambridge, and St. George's Hospital, graduating M.A.Cantab. in 1891, and M.D., B.C. in 1898. He acted as honorary secretary of the Cambridge Tuberculosis Commission from 1899 to 1901, and as resident scientific investigator at Blythwood Farm, Stansted, to the Royal Commission on Tuberculosis in 1902. He was the author of a work entitled *The Influence of the Milk Supply on the Spread of Tuberculosis*. He had joined the Militia in 1881, and in 1900 he volunteered for active service in the Ashanti campaign, where he served as commandant of the advanced base of the expeditionary force, with the rank of Major. Subsequently he commanded the 4th Battalion of the South Wales Borderers, of which he was afterwards honorary Colonel. In 1910—Coronation year—Colonel Sladen was invited to become Mayor of Tunbridge Wells, where he had but recently gone to reside. He held office for two years, and in 1912 received the freedom of the borough. During the war he acted as recruiting officer and as military representative at Tunbridge Wells. He was a Justice of the Peace for the County of Kent, chairman of the local justices, and for some years was a member of the Kent County Council. Colonel Sladen had not practised medicine for many years, but he was interested in every philanthropic and charitable work in the Tunbridge Wells district, where he wielded great influence, which was always exerted for the good of the people. He is survived by his widow, with whom much sympathy has been widely expressed.

WE regret to hear as we go to press that Sir SYDNEY BEAUCHAMP, M.B., a well-known practitioner in the West End of London, was killed in a street accident on the night of November 22nd.

PROFESSOR ERB, the celebrated neurologist, of Heidelberg, died recently at the age of 83.

Universities and Colleges.

UNIVERSITY OF OXFORD.

AT a congregation held on November 19th, the degree of Bachelor of Medicine was conferred, *in absentiâ*, on D. G. K. T. Cross, of St. John's College.

In this column last week the announcement was made that M. H. MacKeith, B.M., B.Ch., had been elected to a Fellowship at Magdalen College. Dr. MacKeith asks us to state that the position he holds is that of Lecturer to the College, and not that of Fellow.

UNIVERSITY OF CAMBRIDGE.

AT a congregation held on November 18th, the degree of M.D. was conferred on W. A. Anderson, and the degrees of M.B. and B.Ch. on E. A. H. Grylls.

The Molteno Institute for Research in Parasitology will be opened by Earl Buxton at Cambridge on Monday, November 28th, at 3 p.m. It will be remembered that the new institute, to which several references have been made in these columns, is a gift to the University from Mr. and Mrs. Percy A. Molteno.

The number of medical students in residence at the University this term is 501; of these 136 are in their first year, 138 in their second year, 152 in their third year, and 75 in their fourth year.

UNIVERSITY OF LONDON.

THE following candidates have been approved at the examination indicated:

THIRD M.B., B.S.—§Frances S. Barry, *‡Geraldine M. Barry (University medal), †C. O. Davies, †M. C. Hartley, ‡H. C. V. Joy, *D. M. Lloyd-Jones, *Maud Sanderson, ‡Kathleen A. H. Sykes, ‡‡E. W. C. Thomas, Dulcie S. Adkins, J. S. Alexander, G. C. Berg, P. C. Brett, W. M. Brown, J. D. M. Cardell, Dorothy S. Chamberlain, Cecil S. Cloake, Ivy Collier, P. N. Cook, Barbara Cubitt, G. Day, Edith M. Down, R. B. Green, Eleanor Harse, R. W. P. Hosford, A. S. G. J. M. Huggett, B. L. Jeaffeson, Marjorie M. Jefferson, Doris E. P. Jolly, A. N. Kingsbury, Anna G. M. Lewis, D. J. A. Lewis, I. Lewis, K. W. Lewis, I. H. Lloyd-Williams, Muriel J. Lough, A. McKenzie, Dorothy McNair, J. A. W. Robinson, S. Rose, Ruth M. Scutt, W. H. Simmons, J. E. Stacey, Ruth C. Townshend, Norah Tregear, Doris L. Veale, Gladys M. Waubope, K. M. C. Woodruff.

* Distinguished in medicine. † Distinguished in forensic medicine. ‡ Distinguished in surgery. § Distinguished in midwifery.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE following is a list of successful candidates at the first professional examination for the diploma of Fellow, November, 1921:

W. C. Abell, N. F. Adeney, J. C. Ainsworth-Davis, Annie Anderson, J. B. Barnett, A. P. Bertwistle, D. P. Bhargava, H. C. Brayshaw, L. G. Brown, W. G. S. Brown, H. Bruce, W. K. Connell, J. A. Currie, V. W. Dix, J. Elgood, F. N. Foster, F. P. Fouché, A. J. Gardham, W. H. George, C. S. Gideon, G. H. Gidlow-Jackson, Katharine A. C. Gillie, J. D. Grierson, K. W. Heritage, E. Holmes, J. A. James, Gwladys R. Llewelyn, N. P. L. Lumb, A. G. Lumsden, A. C. McAllister J. McCormack, J. R. McDonald, N. Makar, W. A. Mill, C. I. N. Morgan, J. D. R. Murray, J. R. Nicholson-Lailey, Constance M. Ottley, K. O. Parsons, A. A. F. Peel, R. S. Scott, H. W. Symons, G. L. Thompson, F. C. O. Valentine, G. T. Verry, A. S. H. Walford, A. L. Walker, G. C. Wellish, D. R. Wheeler, J. G. Whitaker, P. B. Wilkinson, V. Wilkinson, A. L. Yates.

Annual Meeting of Fellows and Members.

The annual meeting of Fellows and Members of the Royal College of Surgeons of England was called for November 17th. A quarter of an hour after the time fixed for the commencement of the meeting, the President (Sir Anthony Bowlby) entered the hall and stated that a quorum had not been secured and that, therefore, the meeting could not be held. The number present at the moment was twenty-nine, and according to the rules of procedure there could be no meeting unless at least thirty were assembled within fifteen minutes after the hour. Several members appealed to the President to waive the technical objection, but he declared himself unable to do so. Strong protests were then made by members, who pointed out that in the meantime one or two others had arrived, so that a quorum was now present; moreover, that presumably some of the President's colleagues, members of the Council, were in the ante-room, and that had they come in as usual a meeting would have been constituted. The President replied that obviously a quorum was required in the room itself, and that no count could be taken of members who might be in other parts of the building; also that a quorum must be secured within the fifteen minutes' grace. He declined to reconsider the matter, and retired while the protests were still being made.

Thereupon the members, exactly thirty now being present, decided to hold a meeting, and voted the President of the Society of Members, Dr. J. Brindley-James, to the chair. A resolution was moved from the chair and seconded by Mr. Dennis Vinrace, affirming the desirability of admitting the members to direct representation on the Council of the College. The proposer said that no one outside the Council could be found to support its action in denying the just and reasonable claim of the members to representation, and the seconder quoted the replies which the Council had made of recent years, and commented upon their weakness and inadequacy. He said that ultimately the appeal must lie to the Privy Council.

Dr. S. C. Lawrence, the Secretary of the Society of Members, protested in very strong terms against the treatment meted out to the members that afternoon. The government of the College was proved to be an oligarchy, and the action of the President on that occasion confirmed everything that he had ever said about it. He thanked God that the members had had nothing to do with placing such a man in that position. He urged that it was a matter for regret that the President should stoop to the mean action of keeping his colleagues on the Council waiting outside while he himself came in to announce that there was not a quorum, which there would have been had those members made their appearance. He was preventing the exercise of the rights and privileges of the members. The members had been treated with absolute contempt. The President had taken advantage of the occasion to escape their criticism.

The resolution was carried by 22 votes to one, the dissentient remarking that the slanderous attack upon Sir Anthony Bowlby had entirely changed his sympathies, and as a protest he could only vote against the resolution and immediately withdraw, which he did.

Other speakers described what had occurred as an affront to the members, and as something which could not have happened in any other assembly, from the House of Commons to a meeting of a board of guardians. Dr. F. G. Lloyd, however, admitted that there had not been a quorum, and therefore the President, strictly speaking, was within his rights in refusing a meeting. Dr. Lloyd had charge of a resolution which requested the President and Council to nominate at least two members in general practice to represent the interests of general practitioners in the management of College affairs. He said that this was the thirty-fourth year in which this protest had been made; it had been made under discouraging circumstances and sometimes discourteously received, but he cited a long list of eminent Fellows who had agreed with the members' demands. Dr. Arthur Haydon supported the resolution, but urged that the number of general practitioners nominated should be five instead of two. Dr. David Roxburgh

thought that it was time that the Society of Members turned its activity into another direction, and he suggested that it should endeavour to get the election of the President of the College into the members' own hands. The resolution was carried, as was a further resolution requesting the President to make a detailed statement of the reasons, legal or otherwise, for the Council's refusal to allow representation, and to state also whether legal advice had been taken, and, if so, what was its tenor. It was agreed to forward the resolutions to the Council.

Medical News.

THE annual meeting and dinner of the Epsomian Club will take place in the Oak Room, Trocadero Restaurant, Piccadilly Circus, on Thursday, December 8th. The meeting will be held at 6.15 p.m. and the dinner at 7.15. Dr. H. E. Haynes will take the chair. The charge for the dinner will be 10s. 6d. without wine. It is particularly requested that members of the club intending to be present will notify the honorary secretary, Mr. S. Maynard Smith, C.B., F.R.C.S., 49, Wimpole Street, London, W.1. The list of addresses of members is still inaccurate, and the secretary will be glad to be informed of any necessary corrections.

THE annual dinner of the Medico-Legal Society will take place at the Holborn Restaurant on Wednesday, December 14th, at 7.15 o'clock. The honorary secretary is Mr. Ernest Goddard, 3, South Square, Gray's Inn, W.C.1.

TWO medical men have recently been called to the Bar—Dr. John Divine, of Lincoln's Inn, and Dr. Philip Barlow, of the Middle Temple.

THE annual dinner of the Cancer Hospital will take place at the Hotel Cecil on Thursday, December 8th. The chair will be taken by Sir Charles Ryall. Tickets (35s. each) may be obtained from Mr. Cecil Rowntree, 9, Upper Brook Street, W.1.

THE third annual dinner of the Association of Certificated Blind Masseurs was held at Pagani's Restaurant, on November 14th. The President, Sir Arthur Pearson, was in the chair, and amongst the Vice-Presidents who attended were Mr. W. G. Howarth, Dr. Murray Levick, Mr. Mansell Moullin and Mr. A. H. Tubby; the members present including soldiers blinded in the war and trained in massage at St. Dunstan's, and civilian masseurs and masseuses trained under the auspices of the National Institute for the Blind.

THE dinner of the London (Royal Free Hospital) School of Medicine for Women will be held on Friday, December 2nd, at 7 for 7.30 o'clock, at the Connaught Rooms, Great Queen Street, W.C.

THE annual meeting of the Tuberculosis Society will be held on Friday, December 2nd, at 7.30 p.m., at the Caxton Restaurant, Tothill Street, Westminster. The meeting will be followed by a supper in the restaurant, and tickets, price 4s., may be had from the honorary secretary, Dr. F. J. C. Blackmore, 39, Woodland Terrace, Old Charlton, S.E.7. The programme for the ensuing session includes the discussion on January 23rd of a subcommittee's report on the classification of tuberculosis, and a general discussion on May 22nd on the relationship of dispensaries and other institutions for tuberculosis. A provincial meeting has been provisionally fixed for June 26th at Bristol. The ordinary meetings are held at the Margaret Street Hospital at 7.30 p.m.

A MEETING of the Harveian Society will be held at the rooms of the Medical Society of London, Chandos Street, Cavendish Square, on Thursday, December 8th, at 8.30 p.m., when a discussion on "Is the anginal syndrome only of cardiac origin?" will be opened by Sir John Charlton Briscoe, Bt., followed by Sir Sydney Russell Wells, Dr. G. H. Hunt, and Sir William Willcox.

A TABLET erected in the Sir Alfred Jones Memorial Hospital, Liverpool, to the memory of the late Dr. John Grimes, who took a large part in the establishment of the hospital, was unveiled by Dr. W. B. Paterson on November 18th.

THE forty-third autumn general meeting of the Irish Medical Schools' and Graduates' Association was held on November 17th, at Pagani's Restaurant, the President, Major-General Wallace Kenny, C.B., A.M.S.(ret.), in the chair. A resolution was passed conveying to Lady Evatt the sympathy of the association with her and the family at the loss sustained by the death of the late Surgeon-General Sir George Evatt, K.C.B. In seconding this resolution the President remarked that it was a singular circumstance that since their last general meeting their society had lost two of their most distinguished members, both well known Army medical officers, Sir Peter Freyer, K.C.B., and Sir George Evatt, K.C.B. They both were students at Queen's College, Galway, and that far-off seat of learning might well be proud of having sent out two such distinguished alumni. The high esteem in which Evatt was held by the Royal Army Medical Corps (which owed its inception to his efforts) was shown by his being one of the four honoured by having their *plaques* placed on the walls of the Royal Army Medical College in Chelsea. The meeting of the association was followed by a dinner at which the loyal toasts were drunk with enthusiasm, all the company of eighty-three members and their friends standing up and singing "God save the King."

THE celebration of the seventh centenary of the faculty of medicine of Montpellier was accompanied by the inauguration of the monument of Rabelais, its most famous alumnus, by the President of the French Republic, M. Millerand, on November 4th. Many banquets and receptions were held during the celebrations, at which delegates were present from all parts of the world, and, according to the *Paris médical*, an average of a dozen orations were made each day during the four days of the ceremonies.

THE tenth Italian Congress of Stomatology was held at Trieste from October 1st to October 4th, when the following subjects were discussed: Dental service in schools, introduced by Professor Piperno of Rome; regulation of medical studies in view of the necessity of specialization, introduced by Professor D'Alise of Naples; oral sepsis, introduced by Dr. De Vecchis of Naples; modern progress in oral surgery, introduced by Dr. Cavini of Bologna. Rome was chosen for the eleventh congress in 1922.

DR. HARVEY CUSHING was elected president of the American College of Surgeons for the ensuing year at its meeting held recently in Philadelphia.

SIR GEORGE T. BEILBY, F.R.S., Sir John Cadman, K.C.M.G., and Professor J. S. Haldane, M.D., F.R.S., have been appointed to represent the medical or other sciences on the Advisory Committee for Coal and the Coal Industry set up under Section 4 of the Mining Act, 1920. Sir Andrew R. Duncan has been appointed chairman of the Committee.

A POST-GRADUATE course on oto-rhino-laryngology will be held at the Lariboisière Hospital, Paris, commencing on December 3rd, and continuing thrice weekly, comprising twenty lectures and demonstrations. The fee is 150 francs, and further information may be had from the Faculty of Medicine, Paris.

IN addition to Dr. J. W. Edwards, Minister of Health, whose appointment we noted recently, two other medical men are included in the new Canadian Ministry, Dr. L. P. Normand, President of the Privy Council, and Dr. R. J. Manion, Minister of Soldiers' Civil Re-establishment.

THE pupils and friends of Dr. J. Darier are presenting him with his bust, by Sabouraud, and a medallion, engraved by Dr. Paul Richer (famous both as physician and as artist), on the occasion of his retirement from the Saint-Louis Hospital, Paris.

A MEMORIAL was unveiled recently at Tournai, Belgium, to Brisseau, who published in 1705 the first account of cataract.

A MEETING of the Midland Tuberculosis Subgroup of the Society of Medical Officers of Health will be held at the Antituberculosis Centre, 44A, Broad Street, Birmingham, on December 3rd, at 3 p.m.

STATISTICS show that the marriage rate in Prussia has more than doubled since 1913; in that year about 15 persons in every 1,000 were married, in 1920 the rate was 28, and now it is 32. The annual birth rate has not kept pace with the increase in marriages; in 1913 it was 29 per 1,000, and in 1920, 25 per 1,000.

A BUST of the late Professor G. Galeotti is to be placed in the pathological institute at Naples, the scene of his long and distinguished labours.

THE American Red Cross has issued as postcards reproductions of some of the thirty posters made by M. Poulbot, whose drawings of children are so popular in the French press, for the Child-health Exhibition which has been touring the larger cities of devastated France since May.

THE late Mr. Richard Braithwaite Green, of Huyton, Lancs, who died on September 6th, has left net personalty of £172,954. After certain bequests, he leaves all his property to his wife, on whose decease the University of Liverpool is to receive £20,000 as an Ann Green bequest, to be applied as the council of the University may from time to time see fit, and the Liverpool Royal Infirmary £1,000.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediocra, Westrand, London;* telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

DR. S. A. MONTGOMERY (Cleethorpes, Lincs) desires information as to the value of Condurango bark in inoperable cases of gastric cancer, or its use in any stage of the disease.

INCOME TAX.

"D. W. F. J." is tuberculosis physician for a county area. He inquires whether he can claim the benefit of the three years' average.

*** As he appears to hold an office under a body corporate or incorporate he would seem to be assessable under Schedule E, in which case the statutory basis of liability is the amount of the salary payable for the actual financial year.

"J. C. C. H.," who resides abroad, inadvertently paid a claim for income tax in respect of interest on war loan. He has written to the collector for repayment, but cannot obtain a reply.

*** We suggest that he write to the Secretary, Inland Revenue, Somerset House, W.C.2, explaining the circumstances in full. It will be advisable to state the English address at which "J. C. C. H." was residing, and to quote the year for which the assessment was made, and, if possible, the assessment number appearing on the collector's receipt.

"J. F. D." took a partner this year, and the inspector declines to make separate allowance for the expense of renewing his own car or for his children.

*** The inspector has no option in the matter; an income tax assessment on partnership profits must be made in one sum. But, of course, "J. F. D." and his partner need not—as between themselves—bear the net tax charged in the ratios in which they divide the receipts of the practice. What is really wanted is a recalculation of the joint liability on the basis of separating the expenses and allowances, so that "J. F. D." and his partner may divide the tax payable correctly between themselves; the inspector may be able to assist in calculating that division.

LETTERS, NOTES, ETC.

AT the second annual general meeting of the Southend Doctors' Cricket Club the following officers were elected: President, Dr. H. Cleveland Smith; captain, Dr. T. B. Sellors; vice-captain, Dr. Gordon Hopkins; honorary secretary Dr. A. W. Holthusen. Last season the club won three games and lost six.

BIRTH CONTROL.

DR. HALLIDAY SUTHERLAND (London, W.) writes: In the JOURNAL of November 19th Dr. Marie C. Stopes states that birth control "has hitherto (erroneously) been much prejudiced in popular opinion by being supposed to be an atheistical movement originated by Bradlaugh," and points out that the origin of the movement may be traced to an earlier date. Both of these statements are true. The propaganda for artificial birth control began in 1854, when the late Dr. George Drysdale first published *The Elements of Social Science*. Dr. Drysdale was a sincere atheist. As Dr. Stopes has had the courtesy of your columns, I beg leave to quote, without comment, her opinion of the medical profession. In the course of a letter dated November 14th, 1921, and published in the *Sussex Daily News*, and in the *Midland Daily Telegraph*, Dr. Stopes writes:

"That there may be medical men who do not approve of birth control is natural, when one remembers that a doctor has to make his living, and can do so more easi y when women are ailing with incessant pregnancies than when they maintain themselves in good health by only having children when fitted to do so. Opinions of medicals, therefore, must be sifted. The best doctors are with us; the self-seeking and the biassed may be against us."

DR. BINNIE DUNLOP (London, S.W.) writes: Dr. Marie C. Stopes, whose valuable books I constantly recommend, protests (page 872) against the statement that the birth control movement in England dated from the trial of Charles Bradlaugh in 1877—for republishing Dr. Knowlton's pamphlet, "The Fruits of Philosophy," because the Government had interdicted it. She must admit, however, that there was no *organized* movement anywhere until Bradlaugh and the Doctors Drysdale, immediately after the trial, founded the Malthusian League, and that the decline of Europe's birth rate began in that year. It may now seem unfortunate that the pioneers of the contraceptives idea, from 1818 onwards (James Mill, Francis Place, Richard Carlile, Robert Dale Owen, John Stuart Mill, Dr. Knowlton, Dr. George Drysdale, Dr. C. R. Drysdale, and Charles Bradlaugh), were all Freethinkers; and Dr. Stopes harps on the religious and praiseworthy Dr. Trall, an American, who published *Sexual Physiology* in 1866. But Dr. Trall was not at all a strong advocate of contraceptive methods. After a brief but helpful reference to the idea of placing a mechanical obstruction, such as a sponge, against the os uteri, he said:

"Let it be distinctly understood that I do not approve any method for preventing pregnancy except that of abstinence, nor any means for producing abortion, on the ground that it is or can be in any sense physiological. It is only the least of two evils. When people will live physiologically there will be no need of preventive measures, nor will there be any need for works of this kind."

A COPROLITH.

MR. EDWARD J. DOMVILLE, while searching for information on another subject, came across the enclosed announcement in a West Country newspaper of August 9th, 1786:

"We hear from Holdsworthy (Devon) that last week a man of that town, after experiencing for many days the most excruciating labour pains, was safely delivered in his own garden, by the anus, of three small, hard, inanimate lumps, one of which, when cleaned, bore strong marks of the human face. This, though wonderful, is really a fact, which can be attested by the principal inhabitants of the place; and the curious may be favoured with a sight of the offspring, by applying to Mr. Collins at the White Hart, Holdsworthy, who will preserve them for that purpose."

It would seem that the eighteenth-century host of the White Hart would not have had much to learn from a twentieth-century advertising agent.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 28, 29, 32, 33, and 34 of our advertisement columns, and advertisements as to partnerships, assistantships, and locum tenencies at pages 30 and 31.

THE Home Secretary announces a vacancy for a medical referee under the Workmen's Compensation Act, 1906, for the Preston and Chorley and Lancaster County Courts in Circuit No. 4. Applications to the Private Secretary, Home Office, by December 14th.

THE appointments of certifying factory surgeons at Newton Abbot (Devon) and Cardigan (Cardigan) are vacant.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Six lines and under	0	9	0
Each additional line	0	1	6
Whole single column (three columns to page)	7	10	0
Half single column	3	15	0
Half page	10	0	0
Whole page	20	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.